GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

Engin. Library

AUG 23

The Right Combination!

EMCO Pressed Steel Meters on lines controlled by EMCO Low Pressure Balanced Valve Regulator and Nordstrom Valves.

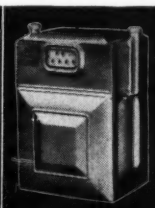
EMCO has the right combination of meter and regulator for every setting. EMCO Meters and Regulators fit together like hand in glove. Properly engineered pairings can be made from the most complete range of sizes and types available. Let our technical staff advise you on your next large volume installation. Get the maximum in service and revenue at minimum cost per cubic foot measured.

PITTSBURGH EQUITABLE METER CO.

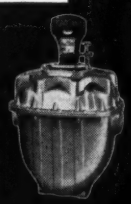
Atlanta **MERCO NORDSTROM VALVE CO.** Boston
Brooklyn Main Offices, PITTSBURGH, PA. Buffalo
Chicago Columbia Houston Kansas City Los Angeles
New York Pittsburgh San Francisco Seattle Tulsa
National Meter Division, Brooklyn, N. Y.

EMCO Meters and Regulators

EMCO Standard Domestic Meter



EMCO Tin Meter for Domestic Service



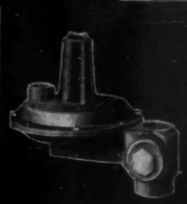
EMCO No. 4 Meter with EMCORECTOR

EMCO Large Capacity Pressed Steel Meter

EMCO Balanced Valve Pilot Loaded Regulator

EMCO Balanced Valve Regulator with EMCOLOADER

EMCO "1001" Regulator Standard Type



EMCO Type "B" Ejector Regulator

. . . for use with

ANY FUEL GAS

- ✔ Liquefied Petroleum Gas
- ✔ Natural Gas
- ✔ Manufactured Gas
- ✔ Mixed Gas

BASO

A.G.A. and U.L. APPROVED

PATENTED

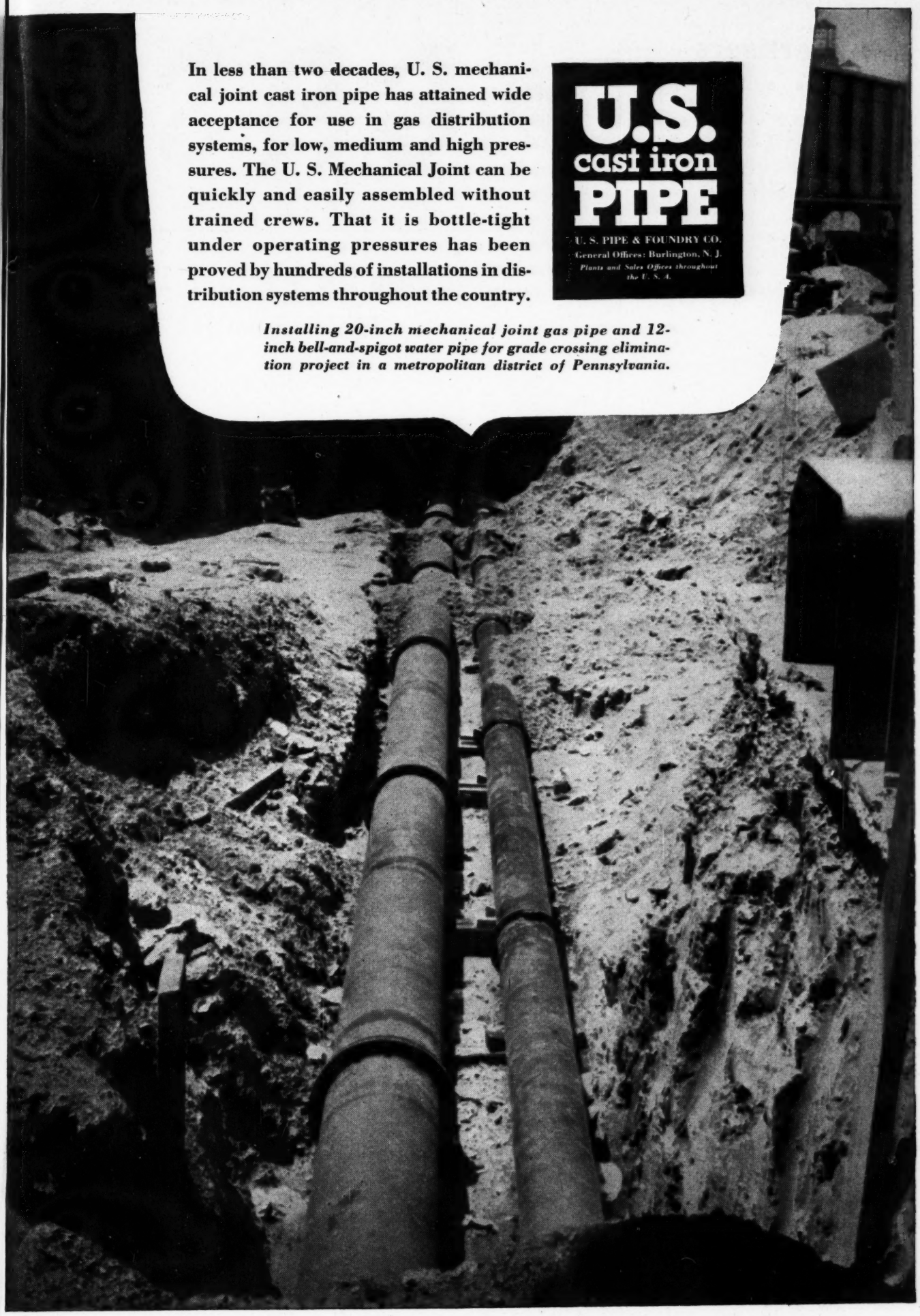
MILWAUKEE GAS SPECIALTY CO.

MILWAUKEE 3, WISCONSIN

In less than two decades, U. S. mechanical joint cast iron pipe has attained wide acceptance for use in gas distribution systems, for low, medium and high pressures. The U. S. Mechanical Joint can be quickly and easily assembled without trained crews. That it is bottle-tight under operating pressures has been proved by hundreds of installations in distribution systems throughout the country.

U.S.
cast iron
PIPE

U. S. PIPE & FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices throughout the U. S. A.



Installing 20-inch mechanical joint gas pipe and 12-inch bell-and-spigot water pipe for grade crossing elimination project in a metropolitan district of Pennsylvania.

Advertisers

American Brass Co. 11
American Cast Iron Pipe Co. —
American Meter Co. 34
American Radiator & Standard Sanitary Corp. 53
American Recording Chart Co. 72
American Stove Co. 56
Association of Gas Appliance and Equipment Manufacturers —

Barrett Division 37
Blaw-Knox 33
Carbide & Carbon Chemical Corp. —

Cast Iron Pipe Research Association 22, 23
Clark Bros. Co., Inc. —
The Cleveland Trencher Co. 71
Connelly Iron Sponge & Governor Co. 66
The Cooper-Bessemer Corp. —
Crane Co. 46
Cribben & Sexton Co. 6

Dearborn Chemical Co. 49
Detroit-Michigan Stove Co. —
Domestic Thermostat Co. 75
Dresser Manufacturing Co. 21

Fisher Governor Co. 55
The Fluor Corp. 12, 13

General Controls 3
General Gas Light Co. —
Grayson Heat Control, Ltd. 59, 60
E. F. Griffiths Co. 74

H-M Regulator Co. 70
H-M Thermo Control Co. 70
Harper-Wyman Co. 4, 5

Johns-Manville 73
Jones & Laughlin Steel Corp. 38

Kidder, Peabody & Company 75
Kitson Co. —

Merco Nordstrom Valve Co. 41, 42
Milwaukee Gas Specialty Co. Second Cover
Minneapolis-Honeywell Regulator Co. —
Mueller Co. 50

National Tube Co. —
Natural Gas Odorizing Co. 8

Pacific Coast Gas Association 68
Pacific Gas & Electric Co. 65
Payne Furnace & Supply Co. Fourth Cover
Pittsburgh Equitable Meter Co. Front Cover
Reliance Regulator Corp. Third Cover
Reynolds Gas Regulator Co. 73
Robertshaw Thermostat Co. —
Geo. D. Roper Corp. —

Semet-Solvay Engineering Corp. 76
Servel, Inc. (Servel Electrolux) 62, 63
Sharples Chemicals, Inc. —
M. B. Skinner Co. 76
A. O. Smith Corp. —
Spencer Thermostat Co. 74
Sprague Meter Co. 45
Stacey Bros. Gas Construction Co. —

Titan Valve & Mfg. Co. 14

Union Carbide & Carbon Corp. —
U. S. Pipe & Foundry Co. 1
United States Steel —
Utility Fan Corp. 69

Vulcan Proofing Co. —

Walworth Co. —
Ward Heater Co. 28
WPB Gas Flow Calculator —
Webster Engineering Co. 67

GAS

REG. U. S. PATENT OFFICE

Twentieth Year of Publication

Contents for August, 1944

EDITORIAL COMMENT

GUEST EDITORIAL: Let's Have Less Talk and More Do in Postwar Planning ..... *By B. A. Seiple* 7
Thermally Thinking ..... *By Elliott Taylor* 9
Post-War Notes and Notions ..... *By Stanley Jenks* 51
Trends and Comments ..... *By Arthur Rohman* 64

FEATURE ARTICLES

Britain Saves Fuel for Battle ..... *By Brian Hill* 15
Allies In Retail Selling ..... *By G. F. Sheeley* 17
Telling the Refrigeration Story to the Community 18
Portland's Postwar Plans Go Into Action ..... *By Don Johnston* 19
Mixed Gas Research ..... *By H. O. Loebell* 24
Trends in Natural Gas Dehydration ..... *By Thomas S. Bacon* 29
Manufactured Gas Plant Investment ..... *By E. L. Hall* 31
Corrosion and Protection of Buried Metallic Structures:
3. Pipe Coatings ..... *Edited by Guy Corfield*
Use and Abuse of the Holiday Detector ..... *By W. H. T. Thornhill and R. C. Stromquist* 35
Fouling Organisms in Salt Water ..... *By William F. Clapp* 36
The Underground Storage of Gas ..... *By E. G. Dahlgren* 43

DEPARTMENTS

Associations 54
People 70
Products 68
Pipeline News 75

Publication Office: **LOS ANGELES 14, California, 1709 West Eighth Street, DRexel 4337.** ***Branches:*** **NEW YORK 17, 420 Lexington Avenue, LExington 2-4816; CHICAGO 3, Illinois, 1064 Peoples Gas Building, HARrison 6634; SAN FRANCISCO, 11, California, Tilden Sales Building, 420 Market Street, Room 149, SUtter 8854.**

JAY JENKINS.....President
JAMES E. JENKINS.....Secretary-Treasurer
ROY D. CRIPPEN.....General Manager
L. V. HOHL.....Eastern Manager
DAVID CARMEN.....Mid-West Manager
ARTHUR ROHMAN.....Vice Pres. and Editor
ELLIOTT TAYLOR.....Washington Editor
GUY CORFIELD.....Technical Editor
T. G. McGUFFICK.....Assistant Editor

August, 1944. Volume XX, Number 8, G A S is published monthly by Western Business Papers, Inc., 1709 West Eighth Street, Suite 320, Los Angeles 14, California. Subscription price: 25 cents the copy; two years for $3; $2 per year; Canada, $3 per year. Entered as second-class matter August 20, 1936, at the post office at Los Angeles 14, Calif., under the Act of March 3, 1879. Member: Audit Bureau of Circulation; Associated Business Papers, Inc. Publishers: BUTANE-PROPANE News; Handbook BUTANE-PROPANE GASES; WESTERN METALS.

GUEST EDITORIAL

Let's Have Less TALK and More DO In Postwar Planning

By B. A. SEIPLE

Vice President in Charge of Sales
Jersey Central Power & Light Company, Asbury Park, New Jersey

PEOPLE used to say that everybody talked about the weather, but that nobody did anything about it. Scientific miracles have come out of this war, however, which have changed men's ideas of space, distance, and even weather conditions.

De-icing machines have made new air routes possible through Alaska to Russia under the severest weather conditions, and the Germans have been astonished to find that American precision bombing through what was formerly considered impenetrable cloud banks has now become routine as the result of new devices. The Russian armies launched their mightiest offensive in the dead of winter over what the Germans believed was impassable terrain.

Air conditioning may temper the seasons for us and now it is not beyond imagination that some day somebody will perfect that long-awaited rain making machine.

Like the weather, post-war planning has reached the stage where everybody is talking about it, but here it is generally agreed that something can be done about it and that answers can be found to the new problems which will confront us.

In the gas utility industry we feel that in order to maintain loads and secure new business, the utility must create sales leadership in merchandising post-war appliances. The gas utility, therefore, is primarily interested in seeing that the maximum number of customers are sold gas appliances in the greatest volume in the shortest possible time. The appliance dealer, on the other hand, is interested in this same business, but from the standpoint of obtaining a fair merchandising profit on his sales.

A sound plan for cooperative effort, or what might be called common sense in merchandising between utility and dealers, is the logical answer to the promotion both of gas as a fuel and of gas appliances. This will be especially true after the war when competition for a share in the consumer dollar will reach a fever heat, with new manufacturers, new distributors and new products, racing to capture the market.

With a variety of large manufacturers not previously in the appliance field now contemplating establishing retail outlets for their products, dealer-utility cooperative postwar planning is now, more than ever, of the utmost importance.

Our company has always believed in a strong direct company merchandise program, supplemented by a good dealer cooperative plan. In sections where dealer organizations are weak, leadership from the utility is more important than ever in promoting dealer sales and influencing dealers in the sale of quality merchandise, particularly where the utility renders a maintenance and repair service.

In its fundamentals, our dealer cooperative plan is this: The company sells in such a way that the dealer can meet prices and terms, and where special load building promotions are undertaken, we extend all such offers to include and encourage dealers. Such a plan offers the dealer equal opportunities for sales and profits, and at the same time creates a strong competitive situation through which we believe best results are obtained.

The development of standard specifications, such as those of Certified Performance appliances, will affect the utilities more directly than either dealer or manufacturer, and will have a bearing upon our operations for many years to come. Postwar planning, therefore, needs also to be carried on cooperatively with the manufacturers.

In all of these phases of postwar merchandising there are important policies which should be worked out now, including policies affecting salesmen, home service organizations, advertising and promotion, and dealer and manufacturer contacts.

Should salesmen, for example, be trained as appliance specialists, or as general appliance men? How shall salesmen be compensated? Shall home service departments act as advisory services only, or as sales builders? Should utility home service department follow up dealer sales? Is advertising to be directed towards specific appliance selling, or toward the value of gas as a service? Should service be free, or charged for? Should the utility give free service on dealer sales, or should both the dealer and the utility charge for service? Should utilities have a separate department for dealer contact, and if so how should dealer contact men be compensated? Should the utility act as a distributor for the dealers in its territory? Should utility advertising include dealers directly, or by general statement?

These are some of the things utilities are talking about, as people talk about the weather. Where the weather was concerned, people just talked about it for a long time, but when men got down to the business of doing something about it, answers began to present themselves.

Postwar planning in one large aspect means the finding of solutions to selling problems, which many of us have let drift through various climatic conditions, so that we have had good selling weather and bad. In my opinion, this is the time to develop the right atmosphere, as scientifically conditioned as possible, in which to muster our forces cooperatively to meet the postwar market.

YES · Service sells captan . . .

the Natural Gas Odorant

● As outstanding as the product advantages of Captan are the *Service* advantages behind it. Not only is Captan warehoused at convenient points for quick out-of-stock delivery to you, ***but there is a Captan Trained Gas Engineer always ready to help you properly and profitably use it.***

Why not ask to have a Captan Engineer go over your odorizing program with you—it costs you nothing—and you will probably save money as well as improve the odorization of your gas.

captan
Advantages

1. GAS-LIKE SMELL
2. AVAILABLE
3. VOLATILE
4. HARMLESS
5. ECONOMICAL
6. EASY TO HANDLE
7. UNIFORM
8. DOESN'T FADE OUT

NATURAL GAS ODORIZING CO.

captan

—the NATURAL Gas Odorant—

LOUISIANA NATIONAL BANK BLDG., BATON ROUGE 2, LOUISIANA
PEOPLES GAS BLDG., CHICAGO 3, ILLINOIS

Thermally Thinking

By ELLIOTT TAYLOR, Washington Editor

Realism Reigns

THERE is a little block of three recommendations tucked away in the "recommendations to the Gas Industry" report of the Post-War Planning Committee of AGA that are right up our alley. Recommendations 3, 5 and 6 are the ones in question, and they urge that: Utilities support the national advertising program of the AGA; that advertising must concentrate on the use of gas in the kitchen; and that the industry itself understand and appreciate what it has to offer in the way of superlative cooking equipment.

As a matter of principle we have always been strong supporters of industry advertising; but we have also felt that any organized group endeavor like that of the association should be well founded in a basic principle—an industry philosophy if you will—and that principle should be adhered to even though the migratory mannerisms of presentation might change. In few words, our idea of what the gas industry should hold up before the American housewife *is the ideal of achievement instead of the wish for escape.*

The new advertising campaign of the Association has abandoned the dream away and forget reality slant, and now goes into the story of performance in a cheerful, gay series, that stresses throughout what gas can do for its users, and what its users can do with gas. This, the current campaign itself, as well as the principle behind it, bespeaks the support of the industry that is so strongly urged by the Post-War Planning Committee.

Recommendation No. 5 contains, in our opinion, a statement that we trust will become and remain the keynote of gas advertising to the housewife. "We (the industry) are the best equipped to provide the acme in precision cooking by means of superior time and temperature control, so that the housewife of tomorrow can *excell in the art of cookery.*" The italics are our own and we are glad to put them there.

The recommendation that follows is part and parcel of the idea promulgated by the other two mentioned, in that it points out the necessity for the industry to know how good its product is, cookingwise, and thus equip itself to tell a complete and enthusiastic story. Here again the creative satisfaction of accomplishment is stressed, when the committee writes "To enable the American housewife to be an artist in the kitchen will reestablish in the postwar period some of our most cherished American Ideals."

Mention is made in the rather extensive discussion of the aspects that make gas ranges superior, of the CP Range as the ideal cooking appliance. This it unquestionably is, and we are of the opinion that a large measure of the success of the CP campaign lay in the fact that it stressed performance; what the housewife could do with the range, and what it would do for her.

It is a firm conviction with us that the entire industry, manufactured, natural or liquefied petroleum gas will look far before it finds a more fundamentally sound foundation on which to build its relations than that of the ennobling and enthronement of accomplishment by the American homemaker in the American home.

Industry Policy

THE natural gas industry is due for some early attention from some Washington agency in the near future, and the only question that remains to be answered is whether it will be the Federal Power Commission or the Bureau of Mines that will be given the congressional nod and a pad full of petty cash vouchers to go ahead on the assignment.

Encouraged in part by the oratory of its own members and heartened by recent Supreme Court decisions reading more authority into the natural gas act than FPC had dared hope was intended, the Commission has fixed its gaze on the goal of completely regulating the end uses of natural gas. It is interesting to note that in the absence of any congressional authorization, and while manfully disclaiming any desire to usurp authority, the Commission has moved rapidly toward the realization of this ambition, in the past few months.

In September, 1943, in an opinion accompanying its order issuing a certificate to Tennessee Gas and Transmission Company, the commission said: "It appears . . . . that the Natural Gas Act does not vest this Commission with complete and comprehensive authority which would permit us to act as arbiter over the end uses of natural gas."

In January 1944, in its report "The First Five Years Under the Natural Gas Act," the Commission reiterated its understanding of this limitation on its authority, saying that ". . . . inasmuch as the Congress had not given it authority to deal with the end uses for which natural gas is consumed . . . it was the duty of the Commission not to seek to exercise such authority until Congress amended the Naural Gas Act to confer on the Commission such specific powers as Congress desired it to exercise."

Between January and June, however, FPC patience with Congress either became exhausted or the Commission decided to view its duty in a somewhat altered light. On June 13th in dismissing an appeal by the Memphis Natural Gas Co. for authority to construct 61 miles of line paralleling a portion of its existing system, and increasing the capacity of the unlooped portion of the system by 21 million feet per day, the FPC said: "In view of the limited natural gas reserves shown by the record to be available to Applicant, their present rapid rate of depletion . . . it is necessary and appropriate in the public interest that such natural gas resources be conserved insofar as possible for domestic, commercial and superior industrial uses."

Thus the Commission moves from a conclusion that probably is incontestable—that a company without sufficient reserves to justify a line, must be denied permission to construct it—back to a premise that is unsupportable under Natural Gas Act—that the superioriy or desirability of the end uses are within the scope of FPC authority.

The Overton resolution in the Senate and its companion measure introduced in the House by representative Mansfield appear to be due for early approval by the Interstate Commerce Committees of both houses,

to which they have been referred. In fact on the Senate side a subcommittee has already reported favorably and only a meeting of the full Commerce committee is awaited to bring the measure out onto the floor of the Senate.

This is obviously an FPC sponsored measure, which in effect will give the commission carte blanche to "inquire into and report to Congress on various measures with respect to natural gas." This the commission is already interpreting to mean that it will have to make a complete and comprehensive investigation of the natural gas reserves, emerging with recommendations for measures that will put the coming conservation of natural gas into the hands of the FPC.

The chief stumbling block in the path of the present FPC scramble for more power over natural gas via the Overton resolution, is the objection voiced by the Department of the Interior, which was vigorously expressed to the chairmen of both committees.

Interior's objection, obviously, is not to either the investigation proposed or to any natural gas conservation measures that might result. Its concern is the fact that conservation has aways been its own particular baby, and it does not look with favor on any outside attempts to muscle in on the child's development. In communications to both Senate and the House Commerce committees, the Department went on record in favor of the natural gas investigation, but recommended that it be made a postwar project, and entrusted to the Bureau of Mines and Geological Survey.

We believe that as between these two agencies of the Federal Government, the Bureau of Mines is the logical one to be entrusted with the task of making an estimate of natural gas reserves. In the first place the FPC has given no evidence that it is competent to make any kind of a survey of the magnitude of the one now proposed. Its apparent impression that the proposed budget of $30,000 originally authorized in the Overton resolution would be sufficient for the work is an indication of how incompletely the project had been visualized. The subcommittee has now raised the ante and will recommend that an appropriation of $100,000 be granted, and that the report be completed on this budget within one year. The Department of the Interior is of the opinion that this is about 10% of the budget and 20% of the time that will be required to do a complete job.

Another factor strongly in favor of the Bureau of Mines is that it is as free of partisanship as any government agency can realistically be expected to be. It has established and maintained a high reputation for scientific detachment from the political implications of its findings; the result is that it has earned and enjoys the cooperation of all the fuel industries that currently cannot be claimed by the FPC. Industry cooperation may not be rated as a prime prerequisite by some Federal agencies, but without it the appraising of the natural gas reserves would be a well nigh impossible task. The thousands of gas pools that would have to be investigated, the canvassing of the best geological opinions and the integration of all the findings into a natural gas picture would require years of patient research backed by subpoena and injunction if industry cooperation were not forthcoming.

We are convinced that natural gas affairs are to be investigated, and we are convinced that out of that investigation there will be formulated a national policy for gas that can include those conservation measures that appear to be most compatible with the social and economic interests of both industry and the public. As we have already pointed out there is no shortage of volunteers who are ready and anxious to delineate and to defend the interests of the public. In the long run both the FPC and the Bureau of Mines will take the position of champions of the rights of the body politic where those rights are in opposition to those of private industry. But of industry champions we are not so sure.

Whether the investigation will take on the aspect of a one sided inquisition with natural gas interests suspect at every turn, or whether it will develop into a cooperative inquiry looking toward the establishment of a national gas policy fair to industry and to the public, will depend in a large measure on the attitude of the industry toward the proceedings.

We believe that now, more than ever before in the history of natural gas, it is essential that a genuine industry policy be formulated, and that that policy be aggressively, intelligently and diplomatically presented to Congress and to any agency or bureau, or commission that Congress may designate as its agent.

We can only reiterate the recommendations that we have made in the past—that some form of industry representation in Washington, more comprehensive and more alert than anything now functioning there is an essential to natural gas welfare. Unless the industry, through competent spokesmen, assists in the formulation of the postwar policy or natural gas conservation, utilization, and relation to other fuels, the industry will find that a policy has been made for it in its own default. And even though that policy may be no more to our liking than was the Hope decision, it will be then just as futile to write editorials or deliver convention orations inveiging against it.

Opportunity

THE appointment of George H. Smith to the newly created post of director of the Natural Gas Department and assistant managing director of the American Gas Association rounds out a development in association affairs that has been in the making for almost a year.

Mr. Smith comes well equipped for the job which, if it is to measure up to the problems that face the natural gas industry, will from the outset be an arduous and exacting task. All of his 15 years' utility experience, his seven years as engineer and eight years as director of the Empire State Gas and Electric Association and his three years in service of first the OPM and later the Office of War Utilities of WPB will stand him in good stead as he assumes the new responsibilities early in August.

He is of course well aware that the department he is to head up and the position that he is to assume were created largely to overcome the growing dissatisfaction with the secondary role that natural gas was playing in gas association affairs. Not the least of his immediate responsibilities will be to reconcile the impatient progressiveness of his segment of the industry with the profound reverence for tradition, age and precedent that marks the professional trade association outlook.

It is no secret, at least it is no secret outside of New York, that the natural gas industry is waiting for and expecting a new approach to its problems on the part of the AGA when Director Smith need only look to the contacts that he has had with the industry over the past three years to verify this statement. His is a unique position in that the specifications of the job that he is about to fill will be very largely written not by his superiors in the association, but by himself.

The natural gas crowd expect a run for their money. We are confident from what we have seen of George Smith during his few years in Washington that he is ready, able and willing to see that they get it.

BRITAIN SAVES FUEL FOR BATTLE

Rationing Averted as Voluntary Economies See Gas Industry Through Winter

By BRIAN HILL

Acting Publicity Officer, The British Commercial Gas Association

BRITAIN'S first nation-wide "Battle for Fuel" had something spectacular about it. It was a test—and the nation realized it—which would show whether, by voluntary economics, the public could avert the need for fuel rationing. The publicity campaign of the Ministry of Fuel and Power started with a bang in August 1942 and ended with the highly satisfactory announcement by the Minister, Major Gwilym Lloyd George, M. P., in April 1943, that the gap between coal production and consumption had been bridged. A saving of 12½% had been made.

Of the 11,000,000 tons saving which was the target for the "First Battle for Fuel" Campaign, economies by heating consumers had accounted for slightly less than half. It was evident in the Spring of 1943 that the average domestic consumer was "fuel economy conscious" and pulling his weight to the best of his ability.

The summer of 1943 therefore saw a diminution in fuel economy publicity so that the public should not be wearied by constant admonitions, and should thus re-act more favorably when the time came to revive the campaign with the approach of colder weather. The publicity efforts of the Ministry during the warmer months were directed to three main objects. The first of these was to encourage the public to lay in stocks of coal against the winter; the second was a strengthening and widening of its organization for promoting fuel efficiency in industry and fuel economy in commercial concerns (fields in which it was felt that still further economies could be achieved); the third was an educative campaign among schools.

Telling the Children

This last activity is interesting since it set out not only to teach the nation's children the current need for fuel economy, but also to acquaint them with the whole subject of fuel and its utilization in the modern world. With the ready cooperation of the fuel industries, the Ministry gathered together material for a library of documentary films, lantern slide lectures and booklets on coal and its derivatives; a list of the material available was circulated to educational authorities and schools by the Board of Education, and as a result there have been, and still are, constant applications for the loan of films and other educational matter from schools all over the country. Gas industry films and other material presented to the Ministry for this scheme covered such subjects as gas manufacture and the by-products of coal carbonization.

The 1943 Campaign

The slogan chosen by the Ministry of Fuel and Power for its publicity campaign which opened in the Autumn of 1943 was "Save Fuel for Battle." In this way fuel economy and the growing preparations for the Allied Nations' assault on the fortress of Europe were closely linked in the public mind.

As in the previous winter, the Ministry made use of all available forms of advertising. Newspaper advertisements in the popular press began by featuring the "Fuel Watcher" — the man or woman whose duty it is to see that fuel is saved in home or factory; gradually advertising assumed a more urgent tone and illustrations of fighting men in battle stressed the point that without fuel the forces must go short of weapons and ammunition. Posters, editorials and window displays carried on the same theme. A subsidiary advertising campaign in the better class national newspapers was concentrated on factory managements. B.B.C. talks varied between helpful hints on fuel useage inserted in the "Kitchen Front" weekly programs and feature talks at various intervals.

DAVIS M. DeBARD has just sent us his 95th Letter from England which contains his report on Britain's second voluntary battle for saving fuel (1943-44), obtained through the interest and courtesy of Mrs. EILEEN MURPHY, home service director of the British Commercial Gas Association. Says Mr. DeBard, "This letter is most timely, as we in the United States and Canada are facing a coal shortage next winter and will need to conserve fuel and better winterize our homes for comfort."

The Industries Campaign

As before, the fuel industries lent the weight of their national organizations and individual units to the Government. The British Commercial Gas Association ran an advertising campaign in 142 national and provincial newspapers and selected magazines throughout the winter; advertisements featured groups of war workers or serving men and women who looked forward to future fuel comfort after the war, but "were saving gas now." Here is the text of a typical advertisement in this series:

> "We'll want labor saving homes . . . but *now* we're SAVING gas."

Balloon sites and aerodromes, cipher offices and advance depots, Admiralty offices and signal stations . . . soon they'll be leaving them . . . they'll want homes . . . labor-saving homes . . . homes equipped with gas. Gas for automatic cookery . . . for well-ventilated and warm rooms . . . for plenty of hot water . . . for refrigerators to keep food cool and wholesome. The Gas Industry with all the accumulated knowledge and experience gained through the war years . . . will satisfy this paramount wish of service women. Meanwhile service women . . . like everybody else . . . know that saving gas and other fuels NOW helps to shorten the war . . . and brings after-the-war-homes nearer.

In addition to this campaign, many gas undertakings published local appeals for fuel economy, and in a number of instances united with their electrical counterparts in joint ap-

peals to the public served by them.

Window displays, lectures, posters and printed matter were produced for and used by the gas industry to support the campaign, and undertakings distributed some millions of copies of similar material produced by the Ministry of Fuel.

The Domestic Front

A feature of the "Battle for Fuel" had been the fuel economy exhibitions staged in the larger towns. In the "Save Fuel for Battle" campaign these became a part of a new movement—the Domestic Front — which had come into being. The Domestic Front covered the work of three Ministries—Fuel, Food and Board of Trade (which was responsible for the administration of the clothes rationing regulations). Women visiting Domestic Front exhibitions therefore learned how to make the best use of food, and fuel, and also how to "make-do and mend" and lengthen the life of the family's wardrobe.

In view of this development, the Ministry of Fuel has appointed a number of women organizers, each one of whom is responsible for a district of the country. The job of these organizers is to stimulate local interest in fuel economy, to enlist the help of the Women's Voluntary Service and other organizations and to see that fuel gets a good shownig in any local Domestic Front activities. They are also performing useful liaison work between the Ministry and the districts, since they are able to point out to the former, areas where publicity needs to be strengthened or given a particular slant.

On the industrial side an immense amount of work, much of it with a long-term value, has been done. Never before has a Government Department set up an organization of experts to visit large consumers' premises in order to show them how to effect savings without a corresponding loss of efficiency. Long years of cheap and abundant coal supplies have led industry to regard fuel as an insignificant part of the total manufacturing expenses. Waste of fuel has been regarded as an invariable accompaniment of industrial activity, or rather the fact that fuel has been wasted in the past has been overlooked.

All this has been changed. Industrial and commercial concerns all over the country are reporting to the Ministry appreciable savings in fuel while still maintaining output.

As an example of the work that is being done, it may be recorded that a single Fuel Efficiency Committee set up under the aegis of one of the Ministry's Regional Controllers has sent experts on over 470 visits to 167 industrial concerns in the area. All firms have been visited twice, some of them more times, according to need. Some 130 ways by which heat from coal, coke, oil or gas has been seen going to waste have been listed, and more than 1000 recommendations have been made for measures to be taken to stop the waste.

The total consumption of coal in these 168 industrial concerns, excluding public utilities, is over 130,000 tons per annum; on a minimum computation, 15,000 tons per annum could be saved out of this total by adopting the experts' suggestions. The firms visited included engineering works, foundries, brickworks, potteries, quarries, rope and twine works, breweries, dairies, laundries, bakeries, nurseries, paper mills and timber yards, as well as a number of hospitals, institutions and schools. Here is a report from one of the firms visited: "Coal consumption: 1st quarter 1943, down 20%; 2nd quarter, down 27%; 3rd quarter, down 28%; 4th quarter, down 22%. Production substantially the same. Reason for reduced consumption Ministry of Fuel and Power advice."

This is the kind of work that is going on all over Britain, work to which the gas industry is lending many of its trained personnel. It is supplemented by lectures to operatives on boiler house management, by meetings on steam utilization and other appropriate matters which have been held in various parts of the country, by "fuel flashes" on internal broadcasting systems, and by the display of industrial fuel company exhibits and posters supplied by the Ministry and moving pictures—"Better Boiler Practice."

Enlisting the co-operation of shop stewards and the appointment of fuel watchers have proved valuable means of attaining the desired results. One large catering firm, for instance, has reported an all-round saving of 12½% since fuel watchers' badges were issued to each of its canteens; similar reports are coming in from other firms.

Britain's Fuel Needs Are Growing

In spite of the very considerable success that has followed the Ministry's efforts both in the domestic and industrial fields, the fuel situation remains serious. Never before in this country's history has such a peak of factory output been attempted: to which must be added the fact that rail traffic has increased: nearly five years of war have strained the capacity of the manufacturing plant of the utility undertakings; and, with the greater part of the nation at war work, domestic habits have changed—meals are taken in shifts, entailing the use of more fuel. Moreover, although the winter was mild, it was colder than the preceding one. February, for example, was 8 or 9 degrees Fahrenheit colder than February, 1943; and it may be taken as an axiom that the consumption of gas goes up or down 1% with every 1 degree Fahr. change in the atmospheric temperature. Finally, the unrest in the coal fields has cost the country many thousands of tons of coal it sorely needs.

The Minister of Fuel has therefore had to lay down certain restrictions regarding the amount of fuel that may be used. Domestic householders, although supplies of gas and electricity are unrationed, may only purchase a prescribed quantity of coal each month and a limit is set to the amount of the total stock held. Industrial consumers had to suffer a 10% reduction in December in the program of coal deliveries; while in April, 1944, a 10% cut in electricity and a 25% cut in gas consumed by industrial concerns was ordered by the Ministry.

With the country now fighting on the "Second Front" and its war potential still mounting, fuel is reaching a position in the public regard that it has never before held. It can be stated with confidence that the nation realizes the seriousness of the position and is determined not to fail its fighting men.

RED TAPE TALES

We decided to hire a man to handle the Catalog department.

In order to find out what requirements we must conform with, I called the United States Employment Service.

They referred me to the War Manpower Commission.

The War Manpower Commission referred me to the Priorities Division.

The Priorities Division referred me to Station 519.

Station 519 referred me to Station 595.

Station 595 referred me to the Office of Civilian Requirements.

The Office of Civilian Requirements told me they will mail me Form SC-2, which we must fill out to find out if we will be permitted to hire a man to handle the Catalog department.

Two days later, Form SC-2 has not arrived.

MANUFACTURER --- UTILITY --- RETAILER --- PUBLIC

Allies In Retail Selling

By G. F. Sheeley

Managing Director, Retail Hardware Association*

THE utilities did much of the pioneering of appliances, not because of the profits which were represented in their sale, but primarily to add load to their lines.

The hardware association recognizes this problem, but it was hard to convince dealers that the utilities had any place in the appliance merchandising field.

Because of this prejudice dealers were rather reluctant at first to accept any cooperation offered them by the utilities in promoting the sale of appliances.

I believe this prejudice has been largely overcome; that the pioneer work has been done; that the purpose for which utilities originally engaged in the merchandising of appliances has been largely accomplished; that the job of selling these appliances can now be entrusted to and done successfully and satisfactorily by the established retailers.

Hardware Retailers in Better Financial Position

Hardware retailers have not only survived all the competition they have faced in the appliance field in the past, but are in better financial position today than ever before. They are looked upon as a reliable and dependable source not only for those major appliances but for such service requirements as are necessary or needed. The servicing of appliances has always been a most important factor particularly with the user, and the manner in which the hardware merchants have serviced their customers during the present period, has helped to strengthen their position in the eyes of the consumer.

By accepting these established dealer outlets, utilities would not have the problem of reorganizing, and re-establishing themselves in the gas appliance field. They would avoid the training of a sales organization which I assume has been rather unsatisfactory and expensive because of the turnover.

Why not spend part of this time, energy and money co-operating with and helping the already established retailers do a better job in selling and servicing these gas appliances, thus accomplishing the utilities' prime and major purpose, that of building loads for their lines?

Naturally, hardware retailers will continue to have competition in the sale of gas and other appliances just as they have had in the past. New retail outlets will spring up; those already established will take on the sale of these lines; new manufacturers will appear who will be seeking dealer outlets.

Manufacturers will be competing against each other to seek retail outlets for their appliances. Much will depend upon the kind of co-operation hardware retailers will secure from the manufacturer and others interested in promoting the sale of particular appliances, as to whose line these retailers will decide to sell, be it gas or electric.

There appears on the horizon a new form of competition for our retailers, in fact all retailers in the appliance field. I refer to the Complete Home Program, which I understand is being promoted by builders, bankers, utility executives and equipment manufacturers. The idea being that "The Packaged Home" should be delivered to the purchaser complete, including all utilities, such as gas ranges, refrigerators, hot water heaters, and other types of equipment and that the entire cost be financed through the FHA 25-year payment plan.

The hardware retailer is concerned in how these various types of home appliances will reach the ultimate "Packaged Home" owner. He can see many headaches for the home owner, particularly from the service standpoint, if the established local appliance retailer is not taken into the program. However, I do not believe, considering the life of the average appliance, that it is practical to include their sale in a 25-year payment program for home purchasers.

Our retailers have always opposed long term contracts in the sale of any major item and Regulation "W" had had our hearty approval and cooperation.

Suggested Cooperation Plan of Gas Utilities

It may appear presumptuous for me even to suggest what I consider a workable program of cooperation between the gas utilities, the gas associations on the one side and the hardware retailers and their associations on the other, in promoting the sale of such major items as gas appliances in which you are primarily interested.

However, I personally feel the ground work has already been laid, that the stage for a program of complete cooperation such as has never been dreamed of, can now be outlined. (See Table 1.)

I believe our hardware retailers are not only ready but willing to accept the gas utilities as their "Allies in Retail Selling" in the sale of gas appliances today. I believe a program of mutually profitable cooperation can be established.

Table 1. Suggested Program of Cooperation Between Utilities and Hardware Retailers

1. Promote a campaign of education among the hardware retailers, advising them of your merchandising policy.
2. Hold meetings of all dealers interested in the sale of gas appliances, acquainting them of your merchandising policy.
3. Institute a newspaper campaign directing prospective customers for gas appliances to the local appliance dealers.
4. Co-operate with the manufacturers in the preparation and distribution of literature and advertising material to be used by retailers in promoting the sale of gas appliances.
5. Furnish the dealers with all prospective customers in their trading area.
6. Cooperate with the manufacturers in holding sales, training and servicing schools for retail sales peoples.
7. Promote schools and demonstrations to develop consumer interest in and use of gas appliances.
8. Promote a program of sound credit terms and reasonable trade-in allowances
9. Use both the gas and hardware associations as clearing houses for the dissemination of such information as will promote and advance the program.
10. For a more intensive and detailed outline of utility and dealer cooperative program, I suggest you refer to the one recommended and in use by the Houston Natural Gas Corp., Houston, Tex.

*Excerpts from a paper presented by Mr. Shelley before the Annual Meeting of the Indiana Gas Association, Indianapolis, Ind., May 16, 1944.

HERE ARE 2 SUGGESTED CAMPAIGNS...
Campaign No. 1
IT'S TRUE, RAY MILLAND
"YOU'RE RIGHT, Margaret Speaks..."
We owners of Servel Gas Refrigerators are lucky! They last longer, never make a sound"
GAS COMPANY SIGNATURE
Campaign No. 2
"As silent as the day we bought it!" says local housewife
"Servel Gas Refrigerator lasts for years..."
GAS COMPANY SIGNATURE
"No Noise! No Wear!"

Servel offers its national advertising to the utilities to tell gas refrigeration's biggest story in each community.

Telling the Refrigeration Story to the Community

SERVEL has again outlined a plan of sales action now. This time it's an invitation to local utilities to tie-in with Servel's national advertising campaign, which is featuring testimonials from big names, Margaret Speaks, Don Voorhees, Ray Milland, and others in the public eye. A booklet, just issued, "Getting Ready for the postwar market with Gas Refrigeration Now!" describes the program.

The Servel story which sold 2,000,000 refrigerators before the war—"Servel Gas Refrigerators stay silent—last longer" is being repeated. And with greater force, since home owners have learned from wartime experience, as never before, the value of "no moving parts to wear." Seven leading magazines, with a combined circulation of 20,0000,000 will carry the campaign.

The ads also carry two other messages (1) a promise of new Servel equipment to come, all-year gas air conditioning; (2) the promotion of the local gas utility as headquarters for home appliances.

Two campaigns are suggested through which the local utility can tell the gas refrigeration story to the community. No. 1 features the national advertisements, with celebrity testimonials. Space is provided for testimonial copy from local Servel owners. (See cut, left). No. 2 gives the testimonial play to the "local housewife." (See cut, right). Both campaigns are available in mat form in the following sizes: 6 columns by 16 in.; 5 columns by 13½ in.; 4 columns by 11 in.

The testimonial theme is also carried over into suggested billboard posters. A new folder, "What users say about Servel" is directed to architects, builders, and realtors.

Five reasons why the Servel ads will get attention and better-than-average-reading, says the booklet,are: (1) human interest, advertisements with people in them get 21% more attention, 60% better reading; (2) well-known people, their testimonials in household equipment get 25% better reading; (3) testimonials, 10.3% more effective than non-testimonial advertising; (4) baby pictures, always a drawing card; (5) copy brevity, 72% greater readership over large, solid blocks of copy.

IF YOU HAVE BILLBOARDS . . .
these poster suggestions will stop 'em and tell 'em
the advantages of Gas Refrigeration
"I have two refrigerators, and I wish they were both Servels"
SERVEL
GAS REFRIGERATOR

Billboards too are suggested in the plan book.

Specialty Dealers To Push Better Grade Gas Ranges

Gas and electric dealers, who sold 23% of the 2,300,000 gas ranges produced in 1941, will concentrate on higher grade gas ranges after the war according to Lloyd C. Ginn, CP Gas Range Chairman, Association of Gas Appliance and Equipment Manufacturers.

Mr. Ginn stated that wartime experiences have proved to housewives that better ranges not only save food, time and fuel, but last longer and require less servicing expense. This is evidenced by field studies, and by the increasing number of inquiries about CP gas ranges being received from consumers and dealers alike.

AGAEM studies indicate that more and more specialty dealers are realizing the importance of informative grade labeling and of promoting nationally advertised quality products that have consumer acceptance as the best means of meeting competition in the postwar era.

If inquiries for the CP Gas Range Manufacturer's Programs are any in-

dication, after the war, the same type of outlets will sell gas ranges in about the same proportion as they did in 1941, Mr. Ginn pointed out.

Inquiries for the CP Business Building Plan Kit being received from various types of dealers, are almost in direct ratio to the total number of gas ranges sold by each type of dealer in 1941.

Retailers Handbook

The Committee for Economic Development on July 26 issued two handbooks, one for wholesalers, another for retailers. The books were prepared by the Association of Consulting Management Engineers and are available only through local CED committees.

Distribution of these handbooks is a part of CED's nationwide program to stimulate America's 2,000,000 business enterprises to plan now in order to create 7 to 10 million more jobs after the war than existed in 1940.

Sample excerpts from the Handbook for Retailers, which is probably of greatest interest to utilities, follow:

> One of the greatest discoveries in retailing was that a step a few inches high would turn away trade.
>
> Many returning service men and high school students have indicated that they want to get into retailing, giving as one reason, "I want to be my own boss." They are thinking about owning small stores.
>
> Investigation has proved that most salespeople are trained to make a good approach, but are only two-thirds as well trained in knowing stock, and half as well in answering objections and closing sales.

Perhaps it might be a good idea if each utility would make certain that dealers, pre-war, present, and potential, received copies of this booklet.

Portland's Postwar Plans Go Into Action

By DON JOHNSTON

Advertising Department, Portland Gas & Coke Company

TO command quick coverage of the ripe postwar gas appliances market when it breaks, a move necessary to assure a maximum volume of the business, Portland (Ore.) Gas & Coke Co. is putting into action some of the preliminary phases of its postwar plans.

Heading the maneuver is a customer survey which will make available an up-to-the-minute record of equipment in each customer's home. This information, compiled from service department calls, customers' office, home service and other commercial department contacts is geographical by districts.

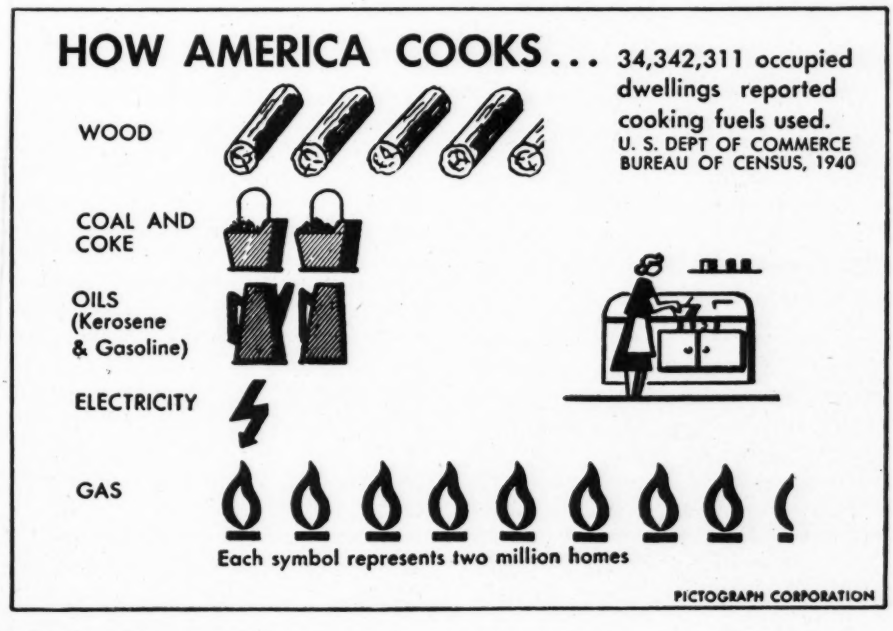
Such fingertip information, instantly available by means of a key sorting system will show the kind, type and condition of all major appliances in the home of customers.

This will enable the sales department to do a selective selling job, such as going after the more vulnerable customers first to protect existing revenue. In this way any type of selective market is available and can be opened to direct mail advertising and other direct selling as desired.

A strong supporting advertising campaign also ties in closely with the postwar plans. Two-color weekly ads in the metropolitan newspapers and black and white ads in 32 other papers in the territory give an inkling of what may be expected from the "magic flame" in the future in the way of new comfort, convenience and performance.

The story also will be told on 50 billboards, a full coverage of car cards and blotter type bill enclosures. A new radio program "Songs of Good Cheer," is sponsored thrice weekly over station KGW. The company also is continuing its sponsorship of the "Mystery Chef" program five times weekly and a local cut-in on the national Servel program, "Fashions in Rations."

Closer contact with dealers also is a part of the plan for letting it be known that gas will play an even greater part when hostilities cease than when they began.



Now 20 CP Manufacturers

Announcement that A. J. Lindemann & Hoverson & Co., Caloric Gas Stove Works, Gurney Foundry Co., Ltd., Roberts & Mander Stove Co., and Western Stove Co. will make CP gas ranges brings to 20 the number of manufacturers who will build postwar gas ranges bearing the CP Seal. These 20 manufacturers produced approximately 50% of the 2,300,000 gas ranges made in 1941.

Other manufacturers: A-B Stoves, Inc., American Stove Co., Clare Bros. & Co., Ltd., Cribben & Sexton Co., Detroit-Michigan Stove Co., The Estate Stove Co., Glenwood Range Co., James Graham Mfg. Co., Grand Home Appliance Co., Hardwick Stove Co., Moffats, Ltd., O'Keefe & Merritt Co., Geo. D. Roper Corp., Standard Gas Equipment Corp., The Tappan Stove Co.

FAMILIES WHO WOULD BUY DURABLE GOODS AND APPLIANCES IF ALL WERE READILY AVAILABLE

Item	Number of Respondents*		Total Who Would Buy		
	Would Buy First	Would Buy Second	Estimated U. S. Total, First and Second Purchases	No. of Respondents*	Estimated U. S. Total
Washing machine	337	134	3,935,676	510	4,261,560
Electric iron	311	116	3,568,012	481	4,019,236
Mechanical refrigerator	304	113	3,484,452	458	3,827,048
Cooking stoves—total	235	99	2,709,904	379	3,166,924
Gas	92	50	1,186,552	159	1,328,604
Oil	58	14	601,632	80	668,480
Wood or coal	56	15	593,276	81	676,836
Electric	29	20	409,444	59	493,004
Electric toaster	195	90	2,381,460	383	3,200,348
Radio	154	89	2,030,508	321	2,682,276
Vacuum cleaner	140	76	1,804,896	286	2,389,816
Sewing machine	128	89	1,813,252	278	2,322,968
Heating stoves—total	72	34	855,736	147	1,228,326
Wood or coal	43	13	467,936	70	584,920
Gas	13	10	199?,188	35	292,460
Portable electric	9	2	91,916	16	133,696
Oil	7	9	133,696	26	217,250
Electric fan	67	64	1,094,636	178	1,487,368
Water Heater—total	48	19	559,852	93	777,108
Gas	24	5	242,324	40	334,240
Electric	14	5	158,764	31	259,036
Wood or coal	9	6	125,340	17	142,052
Oil	1	3	33,424	5	41,780

* Of the 4,488 households interviewd.
Prepared by Office of Civilian Requirements, War Production Board.

Priority Appliances Postwar

DEMAND for consumers' durable goods and appliances today is close to the levels immediately preceding the war, but a large number of families intend to use their savings for buying or building a house before purchasing durable goods, W. Y. Elliott, War Production Board Vice Chairman for Civilian Requirements, said June 1 in making public the results of the Office of Civilian Requirements' third nationwide survey of consumer requirements.

In the survey, made during April by enumerators from the Bureau of the Census, buying information was sought from about 4500 families, selected as proportionately representative of the total population.

Among 11 appliances covered in the survey, washing machines are now in greatest demand, (due to restricted laundry services), with electric irons and mechanical refrigerators in close second and third positions. Other items covered, in the order of present consumer preference, were cooking stoves, electric toasters, radios, sewing machines, vacuum cleaners, heating stove, electric fans, and water heaters.

Mr. Elliott said that the information obtained from representative families all over the country shows that the American public has conserved its household equipment and appliances and the present demand for these items is largely for legitimate replacement needs or from households which now need appliances they did not have before the war.

Among all of the 4488 households interviewed, 44% said they would buy one or more of the listed appliance items at once if they were available, while 56% said they would not buy any of these items immediately, even if there were plenty of all of them in the stores.

The table shows the demand only from households that would purchase the items for their own use. For some of the items, such as refrigerators and stoves, this demand may be substantially increased when they are readily available by purchases which apartment house owners and landlords generally might make for the benefit of their tenants, Mr. Elliott said.

Appliance Sales Outlook in Oklahoma

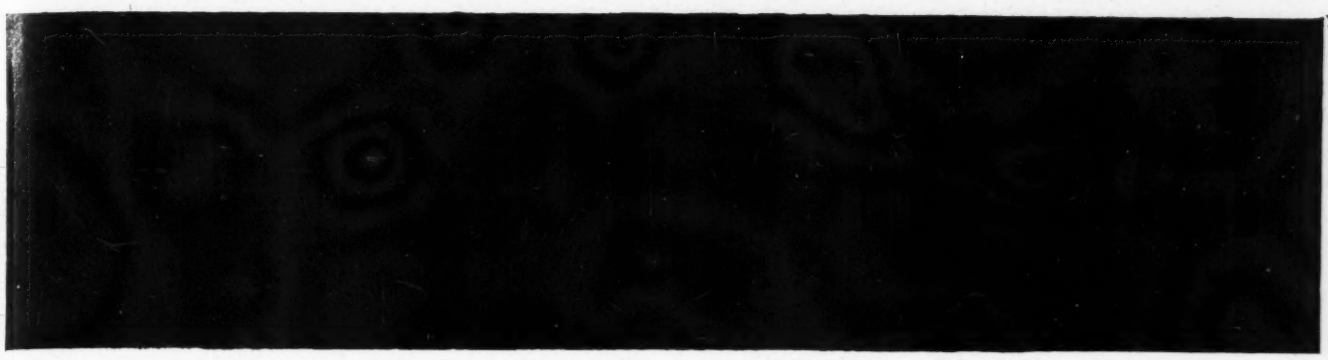
Ending of the war will not release a flood of money which householders will attempt to force upon dealers to secure home appliances and equipment as soon as they are available, but the market will be very much like it was before the war, Harry Canup, Oklahoma City, district price administrator for OPA, told a meeting of about 100 franchise dealers of Hales-Mullaly, Inc., distributors, at Oklahoma City July 26.

Customers for gas appliances and equipment will still be "Mrs. Jones" and "Mrs. Smith," living on average American residential streets, whose means will be limited. They will need appliances but the urge to buy must still be created by competent salesmen representing reliable appliance firms, Mr. Canup believes. He discounted predictions that war bonds and savings of war workers in large volumes, will be awaiting investment in home equipment. A large percentage of the Series "E" bonds, he predicted, will be in the hands of bankers or deposited in bank vaults by individuals, and will not create a vast reservoir of buying power.

Mr. Canup talked from experience as a former sales manager for Hales-Mullaly Co., and from close contact during the past two years with business men of all types as price administrator. He said that he did not wish to throw a scare into the ranks of dealers but only a warning to begin planning now to enter a highly competitive sales field in the good old American way.

The postwar gas merchandising picture will be different in Oklahoma from that in many other states because of a law prohibiting the sale of gas and electric appliances and equipment by public utility companies. Appliance and equipment firms, however, have been pledged the continued cooperation of utility companies in advertising and sales campaigns, after the merchandise is made available in quantities. Carter Mullaly, head of the big appliance distributing firm, outlined to his dealers the old and new lines of gas appliances and equiment he expects to handle and asked dealers throughout the state to advise him of the postwar plans.

Gas air conditioning units will be available after the war, but only in limited quantities for some time, Roy Weinman, district manager for Servel, Oklahoma City told the dealers. He said that most of the larger natural gas utilities in Oklahoma, have pledged full cooperation in advertising, surveys, engineering advice and other services to help the gas merchandising distributors and dealers in Oklahoma to begin installing gas air conditioning equipment as soon as it is available after the war. A high volume of sales will not be sought by his firm at the start, but it will make installations of air conditioning units only after careful inspection of needs by competent engineers, with the purpose of building permanently satisfied customers.



Mechanical joint cast iron pipe meets today's requirements of the gas distribution engineer on all counts. Check them. (1) Its long life and low maintenance cost are proved beyond question. (2) The joint is bottle-tight under all operating pressures in distribution lines. (3) The joint-assembly is simple, fast and well-nigh fool-proof. (4) It does not require a skilled crew. (5) One man and a ratchet wrench are all that's needed to make the joint for the most commonly used pipe sizes.

Mechanical joint cast iron pipe is a time-tested product. The early tests by the A. G. A. Laboratory, which proved it bottle-tight, have been borne out during the past 15 years by satisfactory service under all operating conditions in practically every State in the Union. You do not have to buy this pipe on faith.

The Government encourages the maintenance of gas distribution systems at full efficiency. Mechanical joint cast iron pipe is readily available from any of our members.

For further information, address Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3.

RESEARCH ASSOCIATION, CHICAGO 3

CAST IRON

NO. 1 TAX SAVER

MIXED GAS RESEARCH

By H. O. LOEBELL

Chairman, Mixed Gas Research Committee,
Natural Gas Department and the Technical Section*

THIS subject deals with the research work sponsored jointly by the Natural Gas Department and the Technical Section of the American Gas Association on the use of substitute gases for natural gas and for mixed natural and manufactured gas of from 800 to 1200 Btu. per cu. ft. This work is an extension of the work carried on some years ago on mixed gas research for gases of less than 700 Btu. per cu. ft.

The purpose is to find what gases can be readily produced and substituted for natural or mixed natural gases now distributed, and supplement the present supply, particularly on peak days.

Meeting the peak day demands is of course one of our major problems and while various methods of meeting peak demands by the use of liquefied storage, underground storage, new transmission lines, etc., are in practice now and may be used more extensively in the future, supplementing the existing source of supply with a substitute gas which can be readily produced from materials available may offer in many situations the most economic solution to the peak-load problem.

Peak-load Gas Factors

Character of substitute peak-load gases and the extent to which they may be utilized will of course depend on many factors of both economic and technical nature. Companies having available water gas sets could readily utilize them in production of high Btu. carburetted water gas or blue gas or possibly for reforming natural gas. Many combinations of various mixtures could be resorted to under such circumstances. For example, the blue gas could be mixed with either the base natural gas or butane. The reformed natural gas could be mixed with the base natural gas or butane for use as a suitable peak-load gas. In many situations large quantities of coke oven gas will be available and could be employed for mixing with the base natural gas or butane. The liquefied petroleum gases which may, for obvious reasons, be abundant after the war, lend themselves nicely for cold mixing with base natural gases. Such fuels are usually carburetted with air to a suitable heating value standard. However, mixtures of them with blue gas, producer gas, oil gas, or coke oven gas offer excellent possibilities. It is evident that the method of meeting peak-load requirements with substitute gases having different characteristics than the base natural gas offers an almost infinite variety of possibilities and as such presents a flexible method limited only by availability of such fuels and overall economics involved.

In any specific situation the operating company must establish two criteria as a measure of the acceptability of substitute peak-load gases. The first, as previously indicated, hinges entirely on the economic aspects which in turn involve availability and nature of substitute fuels as well as plant equipment and allied factors. The second criterion is that the substitute fuel or fuels must, when mixed with the base natural gas in the maximum proportion to which they are to be utilized, permit the continued satisfactory functioning of appliances being served. This matter of satisfactory interchangeability is obviously of extreme importance since no value could be attached to any substitute gas which, if mixed with the base natural gas in any substantial proportion, would not permit customers to continue to utilize the appliances in a normal manner. This latter phase of the problem represents the activity in which the committee is now engaged.

Some of the utilization problems involved in interchange of high heating value gases for natural gas are as follows: With manufactured gases there were found to be two limiting conditions on interchangeability; namely, flash-back when the interchange brought about a decrease in input rate and incomplete combustion when substitution of the substitute gas resulted in an increase in input rate. With natural gas interchangeability, two additional limiting factors must be taken into consideration. One of these factors is lifting of the flames which occurs, for example, when 1000 or 1200 Btu. butane-air is substituted completely for natural gas. The other is production of yellow tips which may result under many conditions of interchange. For example, during this investigation complete substitution for natural gas of 1400 Btu. or higher heating value butane-air mixtures resulted in occurrences of yellow tips on several of the appliances tested. These limiting factors of appliance performance under conditions of variable gas composition have never before been systematically studied and correlated.

*Presented at Joint Production and Chemical Committee Conference, American Gas Association, New York, N. Y., June 7, 1944.

Mixtures Covered

The work has been in progress for approximately one year and considerable data from which suitable interchangeability limits can be determined have been obtained. To date, investigational work has covered the following mixtures:

1. High Btu. carburetted water gas varying from 800 to 1400 Btu. per cu. ft.
2. Butane (propane)—air plus natural gas in varying percentages.
3. Butane (propane)—reformed butane (propane).
4. Butane (propane)—reformed natural gas (using steam or air).
5. Butane (propane)—blue gas.
6. Butane (propane)—producer gas.
7. Coke oven—natural gas (800-1000 Btu. per cu. ft.).

Test apparatus employed in the conduct of this work includes appliances such as ranges, floor furnaces, radiant heaters, vented circulators, water heaters and refrigerators. These are the control appliances and were selected after considerable study to present extreme conditions of utilization. Appliances used were recent models, all having been constructed since 1940 and embodying the latest designs in burners, pilots, etc. Each appliance was equipped for use with natural gas and where different burners were supplied by the manufacturer for various types of gases, the natural gas burner was employed.

All of these appliances are adjusted in a normal manner on the base natural gas. However, the primary air adjustment of the various burners

has been set to give percentages of primary air varying from 40 to 80% of the air necessary for combustion thus covering the normal range of field adjustments. Various mixtures of substitute peak-load gases are then supplied to the appliances from the holder at the extreme right. No change in the adjustment of the appliances is made, thereby duplicating conditions in the field where a change in the composition of gas supplied cannot ordinarily be compensated for by readjustment of the appliances. After substitution of the peak-load gas, observations of flame characteristics, burner operating characteristics, and analysis of the flue gases for carbon monoxide are made.

In the event complete substitution of a selected peak-load gas results in unsatisfactory performance of any of the control appliances, subsequent studies are made with a small percentage of the base natural gas added to the peak-load gas. If necessary, the percentage of natural gas is then increased in increments until satisfactory performance is obtained on all control appliances. In this way, limiting percentages of peak-load gas which could be added to the total send-out are determined.

A summary of the effect on performance of control appliances of substituting the various mixed gases after adjustment on Cleveland natural gas is presented in Tables 1, 2 and 3. The number of burners showing satisfactory performance for the various conditions of interchange are given as well as the number of burners on which flash-back, lifting or yellow tips occurred. These tables also indicate performance of mixtures of these gases with natural gas by giving the per cent of peak-load gas that can be used with no adverse effect on appliance operation as determined by results of tests on the control appliances in the laboratories.

Table 2 Data

From study of Table 2 it can be seen that if performance equivalent to that obtained with the base natural gas is to be ensured only 30% of the 800 Btu. carburetted water gas could be used while 40% of the 1000 and 1200 Btu. carburetted water gas mixed with natural gas can be used with complete interchangeability. With the 1200 Btu. gas a 50% mixture could be used for short peak loads if some production of yellow tips could be allowed. It is obvious that neither the 1400 Btu. gas nor the coke oven gas would find much utility due to the fact that only 20% of the former and 15.3% of the latter could be used for complete interchangeability where the appliances are equipped with burners designed for use on natural gas only.

Effect on appliance performance of substituting complete mixtures of butane-air gases and butane-producer gases after adjustment on Cleveland natural gas is presented in Table 2. In each case when 100% substitution was made unsatisfactory performance on several of the control appliances was obtained. As previously indicated lifting or blowing flames may be the limiting factor in some cases. This is illustrated by data presented in this table. With each mixture of either butane-air or butane-producer gas, lifting was responsible for unsatisfactory performance on complete interchange and was predominant for mixtures of either of these gases having heating values from 1000 to 1500 Btu. per cu. ft.

Table 2 also presents the percentages of the various butane-air and butane-producer gas mixtures which could be utilized with satisfactory appliance operation. It should be noted that with the exception of the 1400, 1600 and 1800 Btu. butane-air and the 55% butane—45% producer gas mixtures the percentage that could be utilized would probably be too low for most situations. The 1800 Btu. butane-air mixture requires 70% natural gas for complete interchange but if a slight yellow tip is allowed it can be used up to 50% in the mixture for peak loads of short duration. Also note that the higher the butane percentage in the mixture the greater the tendency toward yellow-tipped flames.

TABLE 1. Performance of Appliances Operating on Various Substitute Gases after Adjustment on 1100 Btu 0.64 sp. Gr. Natural Gas

Substitute Peak Load Gas	Percentage of Peak Load Gas in Send-Out	Number of Burners Performing Satisfactorily	Number of Burners With Unsatisfactory Performance			Pilot Operation	A.G.A. Interchangeability Factor C	Yellow Tip Factor Y	Primary Air Factor P	Lifting Constant K	Lifting Factor L	Flash-Back Factor FB
			Yellow Tip	Lifting	Flash-Back							
800 Btu Carburetted Water Gas	100	12	0	0	4	Too little gas for good ignition	.399	1.218	.926	1.7268	.838	1.59
	75	14	0	0	2		.581	1.220	.862	1.5838	.861	1.43
	30	16	0	0	0	O.K.	.835	1.128	.767	1.335	.977	1.198
1000 Btu Carburetted Water Gas	100	14	0	0	4	Too little gas for good ignition	.551	.994	.842	1.5423	.869	1.448
	75	14	0	0	4		.667	1.049	.808	1.453	.893	1.322
	40	18	0	0	0	O.K.	.829	1.115	.762	1.33	.934	1.166
1200 Btu Carburetted Water Gas	100	11	5	0	2	Yellow & sooty	.823	.700	.735	1.422	.858	1.281
	50	15	Slight 3	0	0	O.K.	.8925	.770	.727	1.314	.913	1.146
	40	18	0	0	0	O.K.	.911	.932	.725	1.295	.928	1.122
1400 Btu Carburetted Water Gas	100	12	6	0	0	Sooty & Carbonizing	.998	.594	.661	1.475	.765	1.287
	20	18	0	0	0	O.K.	1.0095	1.028	.697	1.264	.926	1.07
800 Btu Coke Oven-Natural	51.6	15	0	0	3	Too little gas at low pressure	.5845	1.835	.903	1.523	.924	1.37
900 Btu Coke Oven-Natural	33.3	16	0	0	2	O.K.	.698	1.492	.838	1.397	.952	1.238
1000 Btu Coke Oven-Natural	15.3	18	0	0	0	O.K.	.848	1.340	.783	1.284	.984	1.122

TABLE 2. Performance of Appliances Operating on Various Substitute Gases after Adjustment on 1100 Btu 0.64 sp. Gr. Natural Gas

Substitute Peak Load Gas	Percentage of Peak Load Gas in Send-Out	Number of Burners Performing Satisfactorily	Number of Burners With Unsatisfactory Performance			Pilot Operation	A.G.A. Interchangeability Factor C	Yellow Tip Factor Y	Primary Air Factor P	Lifting Constant K	Lifting Factor L	Flash-Back Factor FB
			Yellow Tip	Lifting	Flash-Back							
1000 Btu Butane-Air Mixtures	100	0	0	18	0	Lifting	.392	1.162	1.158	1.134	1.431	1.462
	20	18	0	Slight 0	0	O.K.	.714	1.139	.821	1.17	1.111	1.109
1200 Btu Butane-Air Mixtures	100	2	0	16	0	O.K.	.533	.954	.988	1.161	1.263	1.401
	20	18	0	0	0	O.K.	.782	1.069	.785	1.181	1.07	1.10
1400 Btu Butane-Air Mixtures	100	6	2	7	3	Slight Yellow	.691	.818	.869	1.181	1.141	1.36
	40	18	0	0	0	O.K.	.801	.898	.801	1.183	1.081	1.173
1600 Btu Butane-Air Mixtures	100	9	2	Slight 4	3	Yellow Streaming	.863	.72	.779	1.196	1.05	1.316
	50	18	0	0	0	O.K.	.869	.790	.775	1.194	1.05	1.199
1800 Btu Butane-Air Mixtures	100	8	8	0	2	Yellow, sooty Carbonizing	1.048	.644	.707	1.207	.98	1.278
	50	18	Slight 0	0	0	O.K.	.975	.738	.733	1.202	1.0	1.183
	30	18	0	0	0	O.K.	.958	.852	.737	1.201	1.0	1.13
35% Butane 65% Producer	100	1	0	17	0	Lifting	.603	.780	.899	1.171	1.18	1.305
	10	17	0	1	0	O.K.	.913	1.128	.749	1.188	1.031	1.046
45% Butane 55% Producer	100	8	4	6	0	Yellow	.879	.663	.762	1.173	1.057	1.23
	20	18	0	0	0	O.K.	.9245	.995	.746	1.187	1.029	1.074
55% Butane 45% Producer	100	5	13	0	0	Yellow & Carbonizing	1.157	.578	.673	1.175	.978	1.18
	30	18	0	0	0	O.K.	1.025	.856	.719	1.185	1.0	1.085

TABLE 3. Performance of Appliances Operating on Various Substitute Gases after Adjustment on 1100 Btu 0.64 sp. Gr. Natural Gas

Substitute Peak Load Gas	Percentage of Peak Load Gas in Send-Out	Number of Burners Performing Satisfactorily	Number of Burners With Unsatisfactory Performance			Pilot Operation	A.G.A. Interchangeability Factor C	Yellow Tip Factor Y	Primary Air Factor P	Lifting Constant K	Lifting Factor L	Flash-Back Factor FB
			Yellow Tip	Lifting	Flash-Back							
30% Butane 70% Reformed-Butane	100	10	4	0	4	Yellow & Streaming	.8445	.776	.747	1.664	.74	1.512
	50	18	0	0	0	O.K.	.8925	.904	.735	1.455	.835	1.284
40% Butane 60% Reformed-Butane	100	11	5	0	1	Yellow & Carbonizing	1.122	.604	.647	1.515	.733	1.35
	60	18	Slight	0	0	O.K.	1.0245	.744	.690	1.417	.82	1.252
	40	18	0	0	0	O.K.	1.00	.850	.713	1.354	.877	1.193
50% Butane 50% Reformed-Butane	100	9	8	0	1	Yellow & Carbonizing	1.3535	.557	.618	1.441	.747	1.31
	50	18	Slight	0	0	O.K.	1.143	.726	.669	1.351	.844	1.197
	20	18	0	0	0	O.K.	1.029	.919	.703	1.27	.929	1.101
30% Butane 70% Blue Gas	100	12	0	0	6	Slight Yellow	.650	.810	.837	1.449	.925	1.47
	30	18	0	0	0	O.K.	.820	1.048	.797	1.2863	.989	1.188
40% Butane 60% Blue Gas	100	10	4	0	4	Yellow & Carbonizing	.912	.632	.739	1.394	.874	1.37
	30	18	0	0	0	O.K.	.915	1.075	.751	1.271	.966	1.156
50% Butane 50% Blue Gas	100	4	12	0	2	Yellow & Carbonizing	1.194	.582	.653	1.338	.836	1.272
	50	18	Slight	0	0	O.K.	1.048	.748	.702	1.293	.908	1.191
	30	18	0	0	0	O.K.	.996	.866	.724	1.263	.951	1.14

Table 3 presents the results of tests using butane—reformed butane and butane-blue gas mixtures. The results for butane—reformed butane are also applicable to butane—reformed natural gas as actual reforming of both gases in the cracking machine employed at the Laboratories produced gases sufficiently identical in chemical composition and physical properties as to be interchangeable for all practical purposes. In fact no difference could be noted in the peformance of 30% butane—70% reformed butane and 30% butane—70% reformed natural gases.

In addition to determining limiting conditions of interchangeability as established by the group of control appliances, fundamental flame characteristic data are also being obtained.

Such data include the characteristic lifting, yellow tip and flash-back limits of all gases utilized in this investigation.

In addition to mixtures of gases, characteristic limit curves have also been obtained on most of the simple gases. Where the limits were not obtainable with the gas alone mixtures of two gases, one of which had known characteristics, were used and the unknown values of the second gas were thus obtained. These data when correlated with results of the control appliances have permitted the establishment of empirical relationships whereby if the chemical composition, heating value and specific gravity of any substitute gas of high heating value are known the characteristic curves* for yellow tip and lifting limits can be plotted for this gas.

A further collateral objective of this investigation is the development of a burner, or some other visual method, which could be employed to determine interchangeability limits for plant control purposes. To determine whether any of the burners commercially available were capable of indicating interchangeability limits, studies were made of the characteristics of a number of such burners. The index numbers for each of these burners were determined for all of the various mixtures utilized in the investigational work. A study of the various index numbers obtained indicate that while these test burners may indicate a systematic trend on any one gas, no specific variation in index numbers from those of the test gas could be established as a limit of interchange.

Review of the results on these burners indicates the necessity for further development of a type of burner that needs no manipulation but will give a visual and accurate determination of the interchangeability of peak-load gases with the base gas.

This year's research program in this field deals only with natural gases as the base load. The plan for future work is to secure similar information for situations where 800 Btu. mixed gas is normally distributed. In these cases the same problems which confront the straight natural gas companies will also be encountered although probably to a somewhat lesser extent. In any event, the limiting conditions of interchangeability of 800 Btu. mixed gases and substitute peak-load gases will, of course, differ substantially from those governing when a straight natural gas constitutes the base load.

*Input rate in Btu. per hr. per sq. in. of port area versus per cent primary air for AGA precision burner.

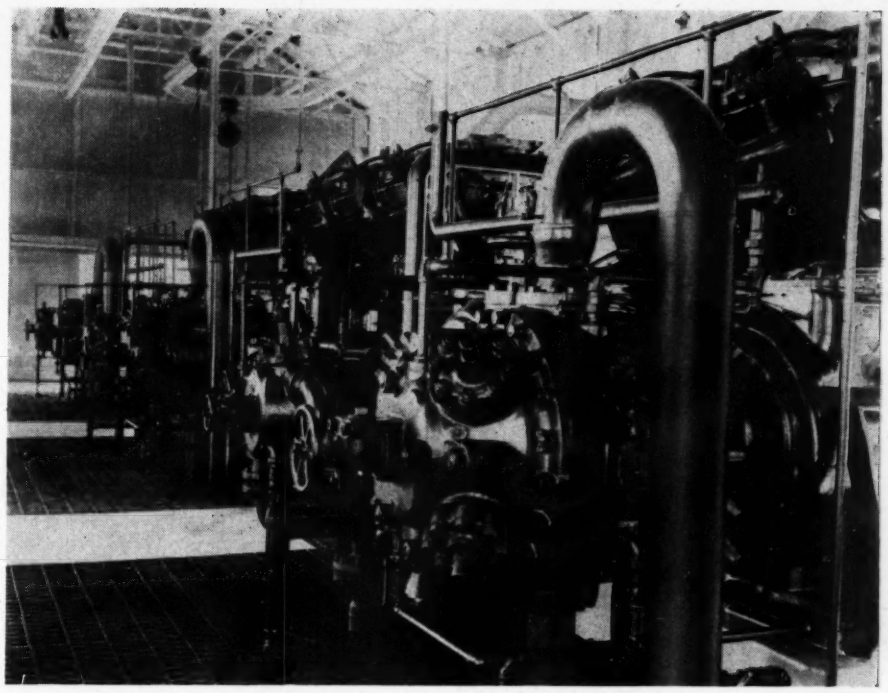


FIG. 1. These three Cooper-Bessemer type G-MV compressor units furnish the power for returning 4,280,000 cu. ft. of gas daily to oil field for recovery of about 650,000 bbls. of oil per year which could not otherwise have been produced in the same period.

Gas-Injection Boosts Out-put at Wertz-Dome Field

INFORMATION concerning a notably successful gas injection operation which recovered an additional 1,623,237 barrels of oil at the Wertz-Dome field of Sinclair Wyoming Oil Co., during the past 2½ years, has been disclosed by The Cooper-Bessemer Corp. The company, with plants at Mount Vernon, Ohio, and Grove City, Pa., builds heavy-duty gas and Diesel engines for industrial and marine use.

Although such projects for increasing the withdrawal rate of oil deposits are not entirely new, the operation at this field, located in the counties of Carbon and Sweetwater, Wyoming, is somewhat unique.

The chief objective of pressure-maintenance is usually to prevent or retard a decline of reservoir pressures in order to attain more efficient and greater ultimate recovery of the oil. Where hydrostatic drive is used, this includes control of water movement into the reservoir to prevent possible trapping of the oil, and the utilization of this natural energy to force the oil uniformly into the well bores. This usually restricts the rate of withdrawal, greatly prolonging the time required to recover the oil.

In order to help meet current war needs, pressure maintenance operations at the Wertz-Dome field have been designed so that a volumetric balance is maintained between the oil withdrawn and the gas injected so that it will be possible to realize maximum oil recovery and deplete the reservoir in much less time than would ordinarily be required.

After a thorough study of the reservoir conditions it was calculated that 1400 cu. ft. of gas would be required to displace a barrel of oil. Thus, by returning to the deposit this volume of gas for each barrel of oil over the normal daily output of 3300 bbls., recovery could theoretically be sustained at any rate desired without decline of pressure, and, by returning a greater volume of gas, the output could be increased.

Gas is injected to the formation through tubing by means of three economically operated, gas-fueled Cooper-Bessemer compressor units (see Fig. 1) totalling 1800 hp. Of the two-cycle, angle type, these six cylinder engines have a rated capacity of 2,000,000 cu. ft. daily with a discharge pressure of 2500 lbs.

To obtain the present high rate of oil production 4,280,000 cu. ft. of gas is pumped daily to the pools at a discharge pressure of 1825 psi.

There's an **IMPORTANT** place for the

WARD FLOOR FURNACE

in your Post-War merchandising program

There's going to be a widespread shift in population when the war ends. And this will mean new homes. Thousands of them will be of the single-story, or bungalow type.

The Ward Floor Furnace is ideally suited to this type of dwelling. It is inexpensive to install, and to operate. It has the consumer acceptance of 35 years of "Know How" in building unit type gas heaters.

You will want the best.

Ward Heater Company

1800 W. WASHINGTON BLVD., LOS ANGELES, CALIFORNIA

Trends in Natural Gas Dehydration

By THOMAS S. BACON

Research Engineer, Lone Star Gas Co., Dallas, Texas*

THE art of dehydration of fuel gas is older than the natural gas industry. However, extensive use of the process of the dehydration of natural gas has occurred only during the past 10 years. Installations for the dehydration of natural gas were in commercial operation prior to 1934, but these installations were few in number and were made only under unusual conditions. Today, substantially all natural gas transmitted over long distances is dehydrated in some fashion.

This tremendous increase in the use of dehydration as a conditioning process for gas entering long-distance transmission lines is due almost entirely to the necessity for avoiding stoppage of these transmission lines due to the accumulation of gas hydrates in these lines. This avoidance of "freezing" troubles is certainly the principal advantage to be obtained from the dehydration of natural gas. However, there are other advantages that are also obtained by dehydration and it appears desirable to further discuss these advantages and also to review experiences of the last few years that have been obtained in connection with the operation of natural gas dehydration plants.

Basic Engineering Factors

The basic engineering factors that must be considered in the design and installation of natural gas dehydration plants have been adequately reviewed in the past by many competent authors. (1) The varying degrees of completeness of dehydration obtained by various commercial processes have also been reviewed. The question of the cost of operation of any given plant is dependent on a wide variety of factors as pointed out in the literature and, in many instances, labor is the most important of these factors.

(2) The Lone Star Gas Co. is presently operating nine separate dehydration plants ranging in capacities from 10,000 Mcf to 160,000 Mcf per day. All of these plants employ diethylene glycol as the dehydration medium and all operate at gas pressures of from 300 to 500 psi. Of these nine plants, only two are located at gasoline plants having personnel available that are trained in operations of this type. Three of these dehydration plants are located in gas fields and are operated by the pressuremen in the field. Three of these plants are located at compressor stations and are operated by the compressor station personnel who have not had experience with absorption and distillation equipment. Our largest plant of the 160,000 Mcf per day capacity is located in a gas field and is operated by one full-time man, who was formerly a mechanic in the pipeline department.

All of these plants are fully automatic in operation and have produced entirely satisfactory operating results with a minimum of down time during their entire periods of operations in spite of the lack of skilled attention. The 160,000 Mcf plant is equipped with a rather complete system of electrically-operated alarms arranged to sound a bell in the pipeline district headquarters office in the event of serious deviation of any important plant function from its designed value. As normal operation of this part of the gas system requires 24-hour attention at this district office, this arrangement avoids the use of shift labor to give continuous attention at the dehydration plant and avoids the consequent expense that would be incurred thereby. After several years of operation of this plant, during which the alarm system has had occasion to function at all hours of the day and night, we have never had occasion to believe that any increase in operating efficiency of this plant could have been obtained by using shift labor at the plant. However, under extreme operating conditions that occur during cold weather periods for only a few days out of the year, we do have someone in continuous attention at this plant.

One serious factor in the early design of the unattended plant was the necessity for the use of steam at appreciable pressures of the order of 100 psi gauge for heating the diethylene glycol still reboiler. This objection has been overcome in some plants by the use of high boiling organic heat transfer mediums, such as Dowtherm. We employ reboilers heated by direct gas fire. This practice not only avoids the use of high-pressure steam, but also reduces the cost of the initial installation. We have had excellent success with these direct-fired reboilers in this service, and find that they are as satisfactory as steam-heated reboilers in all ways.

The importance of properly conditioning raw gas before it enters the dehydration plant proper cannot be too strongly emphasized. The temperature of this raw gas is of extreme importance in designing any kind of dehydration plant and must be controlled within close limits for most efficient operation. At a pressure of 500 psi gauge, the water vapor content of gas at 100° F is four times the water vapor content of this gas at 56° F when the gas is saturated with water vapor. Therefore, it is essential that as much water be removed from the raw gas as possible by pre-cooling before the gas enters the dehydration plant, in order to reduce the load on the dehydration plant. However, the gas must not be pre-cooled below the hydrate-forming temperature if trouble is to be avoided that might be caused by hydrate formation in the plant. Therefore, it is economically desirable to control the inlet gas temperature within close limits, regardless of the type of dehydration process used.

Temperature Control

It is essential to control this inlet gas temperature if the diethylene glycol dehydration process is used, due to the practical limitations on the dew point depression that may be obtained with this process in its present state of development. Therefore, the inlet gas entering a dehydration plant immediately downstream from a compressor station, or a gasoline absorption plant, should be passed through carefully designed coolers before entering the dehydration plant. As a rule, circulating cooling water available in a gasoline plant or compressor station is too warm to accomplish satisfactory cooling of the gas entering the dehydration plant, and a separate cooling tower should be provided for this purpose.

Raw gas may contain oil, gasoline, and water as liquid impurities. We invariably install a separator ahead

*Presented before the American Gas Association, Natural Gas Department, French Lick, Ind, May 11-13, 1944.

of the glycol contactors to remove as much of these liquid impurities as is economically possible. Any gasoline entrained in the gas leaving the inlet separator or any gasoline condensing in the glycol contactor appears to have no detrimental effect on the diethylene glycol dehydration plant. Entrained oil, on the other hand, particularly if of high asphalt or wax content, will be carried by the glycol leaving the contactor to the glycol still in the dehydration plant. This oil will be stripped of its lighter and less viscous fractions in this still and a viscous asphaltic residue may be left in the glycol that will interfere seriously with operation of the heat exchangers and pumping equipment.

Glycol Treatment

In plants where this condition prevails, we attempt to skim as much oil as possible from the glycol leaving the contactor before pressure is reduced on this glycol. In addition, the glycol from the still is passed through a mechanical filter placed just ahead of the pump suction to remove traces of asphalt that would otherwise cause the pump valves to stick. Any entrained water entering the glycol contactor will, of course, be picked up by the circulating glycol and lost from the system as steam leaving the top of the glycol still. Any solids that this water may contain in solution will be left as a residue in the still and may or may not dissolve in the glycol, depending on their chemical composition. We have had one experience in which salt concentrations gradually built up in the circulating glycol and eventually precipitated in the glycol reboiler causing stoppage of the reboiler. It is our present practice to determine salt contents of samples of the circulated glycol in a central laboratory at monthly intervals. When these salt contents become excessive, the glycol is reclaimed by distillation from the salt and other non-volatile contaminates in a small vacuum still.

Certain benefits in addition to the prevention of hydrate formation may be ascribed to the use of dehydration processes. Substantially complete elimination of the internal corrosion of pipe lines is definitely one of these incidental advantages. It is unreasonable to expect any appreciable corrosion of internal pipeline surfaces in the absence of liquid water. This benefit is impossible to evaluate in general and difficult to evaluate in any specific instance but must be of major importance where long-distance high-pressure transmission lines are concerned.

An additional benefit incidental to dehydration is the resulting increase in line efficiency, due principally to removal of all liquids from the line, and due secondarily to avoidance of roughening of the interior of the line by products or corrosion. Engineering data that might be used to evaluate the quantitative increase in efficiency obtained are lacking presently. In one case it has been stated "that a definite increase in pipeline capacity was noticed after the plant was placed in operation.—No definite figures bearing on this increase in capacity were given." (3) Observations on the Lone Star Gas Co. system are incomplete, but indicate an increase in transmission efficiency of the order of 5% in one case. It is reasonable to expect that the following factors would affect the actual increase in line efficiency that might be obtained:

1. Amount of water condensed in the line prior to dehydration.
2. Velocity of gas through the line.
3. Topography of the country traversed by the line.

Interesting experiments are under way presently on a long-distance transmission system comprised of two pipelines side by side. The transmission efficiencies of each of these two lines will be determined with the gas entering one line being dehydrated and the gas entering the other line in its raw condition. After equilibrium has been established in these two lines under these conditions, the transmission efficiency of each line will be determined. Dehydrated gas will then be switched to the other line and raw gas will be allowed to pass through the line that first underwent dehydration. The transmission efficiencies of the two lines will again be determined and a quantitative estimate of the benefits obtained by dehydration on the transmission efficiencies of these lines will then be available.

There has been some indication in the past that smooth internal pipe surfaces would materially increase the efficiency of any given transmission line over the efficiency obtained with the fairly rough surfaces that are now in commercial use. This question would appear to bear further investigation as dehydration of the inlet gas should permit maintenance of a specially prepared smooth internal pipe surface after it had been installed.

It is rather amazing to realize that no satisfactory device has been developed to record the dew point of the treated gas. Millions of dollars have been spent on installation of gas dehydration plants, but the determination of the degree of dehydration accomplished in these plants still relies on a method of testing in which the human element can become of extreme importance, and in which little reliance can be placed unless the operators are continually checked at frequent intervals by a competent supervisor.

REFERENCES

(1) Bibliography—"Dehydration of Fuel Gases," Daniel J. Kerley, published by Mineral Industries Experiment Station, School of Mineral Industries, The Pennsylvania State College.
(2) T. S. Bacon—"Practical Problems in Dehydration Plants—Design and Operation," AGA—Natural Gas Section, 1942.
(3) Henry N. Wade—"Natural Gas Pipe Line Dehydration," The Petroleum Engineer, March, 1943, p. 188.

Alberta Encourages the Wildcatter

THE natural gas and oil industry has spent approximately $136,000,000 on development in the Canadian province of Alberta during the 40 years ended Dec. 31, 1943, and still shows a deficit of $18,000,000, according to a survey completed recently by one of the companies involved.

As a result of the survey, natural gas and oil interests in Alberta have urged the Federal and Provincial governments to inaugurate a three to five year plan whereby the small wildcatter would be encouraged; systematic geological and geophysical prospecting would be intensified; and additional drilling would be encouraged by giving those risking their money a better chance for reward by minimizing government levies.

Drilling and production data for the report was obtained for the most part from records of the Department of Lands and Mines, Alberta government. Other information, such as costs of development, value of production, taxes, royalties, etc., was determined from available records and estimates based on experience.

The report puts value of gas production over the 40-year period at $12,930,000. This total was arrived at by assuming an average of 3c per Mcf. at the well for gas used. Gas produced and used amounted to 431 billion cu. ft. plus, whereas gas produced and wasted was more than double that figure at 963 billion cu. ft. plus. In the past four decades a total of 1149 gas and oil wells have been drilled in Alberta, with gas producers numbering 175. Cost of productive drilling for each well is set at $17,500 for a total outlay in this respect of $3,000,000. Production equipment, at $1000 per well, totals $175,000.

MANUFACTURED GAS PLANT INVESTMENT

Evaluating Production Processes in Terms ot the House Heating Load

By E. L. HALL

Vice President and Chief Engineer, Portland Gas & Coke Company*

POSTWAR considerations, in the gas industry as in other lines of business, impel executives to carefully evaluate their manufacturing processes with reference to available raw materials and competitive conditions.

Perhaps the best opportunity for securing additional postwar load will be from spaceheating. In view of the unfavorable load factor of this business, relative plant investment may become the determining consideration in the choice of manufacturing process.

Hence the gas engineer must include in his studies those considerations having to do with seasonal, daily and hourly load factors. The great importance of annual load factor on manufacturing plant investment charges is illustrated by the chart below Fig. 1 in which the investment per 1000 cu. ft. of daily capacity is assumed at $225. With fixed charges for return, taxes and depreciation at 12% or $27.00 per annum, the cost per Mcf of annual production is seen to vary from 7.4¢ per Mcf for 100% load factor to 37¢ per 20% load factor. For facilities operated only for one day per year, the fixed charges per Mcf are $27.00!

Comparing an assumed manufacturing cost in the holder of 25¢ per Mcf, with the above fixed charges per Mcf at various load factors, the relative importance of the latter is very striking.

Load factors affect distribution investment for transmission and distribution mains, consumers services and meters in a similar way. In this case however hourly capacity rather than daily capacity is the basis.

Climatic conditions in the Northwest are such that with a maximum degree day deficiency of 50—below 65° F. (occuring on the average of five times in a 20-year period) annual plant load factors of 20% are to be expected from spaceheating load. Since this type of business accounts

*Presented at the Pacific Coast Gas Association's Gas Industry Development Conference, Portland, Ore., April 26 and 27, 1944.

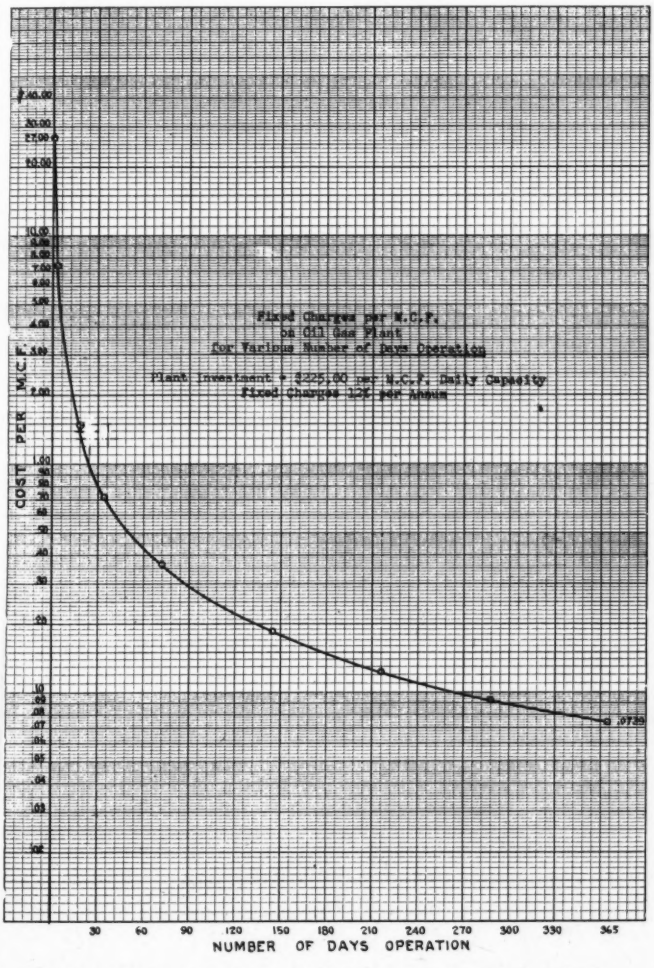

Fixed Charges per M.C.F.
on Oil Gas Plant
for Various Number of Days Operation
Plant Investment = $225.00 per M.C.F. Daily Capacity
Fixed Charges 12% per Annum
FIXED CHARGES PER M.C.F.
NUMBER OF DAYS OPERATION

FIG. 1. Fixed charges per Mcf on oil gas plant for various number of days operation plant investment $225,000 per Mcf daily capacity; fixed charges 12% per annum.

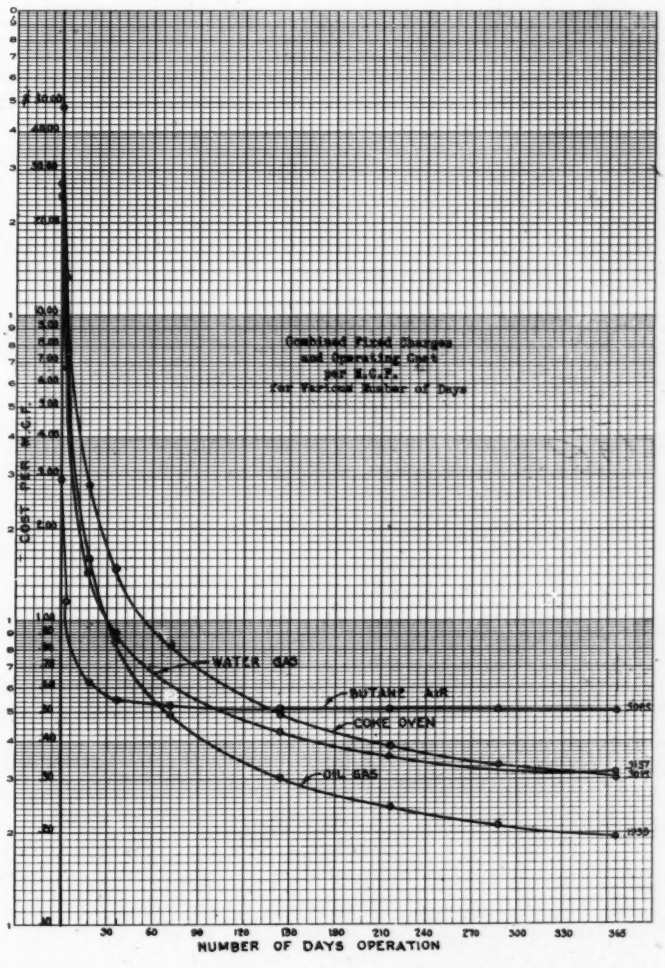


FIG. 2. Combined fixed charges and operating cost per Mcf for various number of days.

TABLE I.

Plant Investment Costs

	*Coke Oven Gas**	*Oil Gas**	*Water Gas**	*Butane Air Gas**
Plant Investment per Mcf Daily Capacity	$400.00	$225.00	$200.00	$20.00
Fixed Charges at 12% per annum	48.00	27.00	24.00	2.40
Cost per Mcf Per Year				
365 days @ 100% Load Factor	.1315	.0739	.0657	.0065
288 " @ 80% " "	.1644	.0925	.0822	.0082
216 " @ 60% " "	.2191	.1232	.1095	.0109
144 " @ 40% " "	.3287	.1849	.1644	.0164
72 " @ 20% " "	.6575	.3698	.3287	.0328
36.5 " @ 10% " "	1.3250	.7367	.6575	.0657
18.2 " @ 5% " "	2.6300	1.4794	1.3150	.1315
3.65 " @ 1% " "	13.1500	7.3972	6.5753	.6575
1 " @ .27% " "	48.0000	27.0000	24.0000	2.4000

*Computed on basis of 525 Btu. equivalent

Operating Costs

Net Holder Cost per Mcf with full By-Product Development	.17	.12	.25	.50

Combined Fixed Charges and Operating Costs

Cost per Mcf.	*Coke Oven Gas**	*Oil Gas**	*Water Gas**	*Butane Air Gas**
365 days @ 100% Load Factor	.3015	.1939	.3157	.5065
288 " @ 80% " "	.3344	.2125	.3322	.5082
216 " @ 60% " "	.3891	.2432	.3595	.5109
144 " @ 40% " "	.4987	.3049	.4144	.5164
72 " @ 20% " "	.8215	.4898	.5787	.5328
36.5 " @ 10% " "	1.4950	.8567	.9075	.5657
18.2 " @ 5% " "	2.8000	1.5994	1.5650	.6315
3.65 " @ 1% " "	13.3200	7.5172	6.8253	1.1575
1 " @ .27% " "	48.1700	27.1200	24.2500	2.9000

*Computed on basis of 525 Btu. equivalent

principally for the unfavorable load factors of the system, most careful consideration must be given to the extent and character of this load and its effect on the choice of manufacturing and distribution investment.

Of the conventional gas making processes available to the gas engineer, coal gas ovens and benches are the most expensive to install and consequently the least desirable for peak load service; oil gas and water gas plants are of lesser cost and better suited for such requirements, while butane plants offer the lowest cost for maximum day capacity.

As to the choice of manufacturing processes from an operating standpoint, the cost and availability of raw materials such as coal and oil are local problems. In choosing the raw material, the manufactured cost per therm is influenced to an almost determining degree by the amount and value of by-products which can be produced and marketed from each kind of raw material. This is true to such an extent that some companies visualize the possibility of putting gas in the holder at a profit. This is indeed the chemical age and progressive gas companies should seek their place in the sun as purveyors of the raw and intermediate materials for chemical industry.

Because of high temperature operation, both coal gas and oil gas plants are producers of the most esteemed of these raw materials—the olefins and aromatic hydrocarbons.

It is beyond the scope of this brief paper to present operating costs for the various processes based on coal or oil, except to illustrate a comparison including both fixed charges and operating costs after by-product credits, all assumptions being based upon hypothetical plants.

The comparison has been made in accordance with the assumptions in Table 1.

The data in Table 1 are shown graphically in Fig. 2. It is quite apparent from Table 1 that load factors will determine the process or combinations of processes which will produce the lowest total cost. The selling price of househeating load may well be influenced to the extent of 11¢ per Mcf by the choice of suitable peak load processes and to an even greater extent by by-product credits.

After having prepared a similar study for his local conditions, the gas engineer will then ask himself if the choice will satisfy distribution conditions. In this respect, he will be confronted with two important requirements.

(a) The gas manufactured should give maximum capacity of mains, services and meters in order to minimize distribution investment.

(b) The quality should be such as to give satisfactory utilization in customer's appliances.

As to the requirement under (a), this is best satisfied by a combination of low specific gravity and high calorific value. Requirements under (b) are satisfied principally if the quality served is constant within certain limitations with respect to specific gravity, heating value, flame velocity, etc.

Difficulties arise principally when blending gases of different character in proportions which vary according to load. Blending coal gas and water gas, or oil gas and butane gas are examples.

The gas engineer who is making his contribution to the postwar planning of his company may well heed the important bearing of poor load factors in his design, caused principally by the seasonal demand of househeating, which while presenting a business opportunity, is also a liability.

Every effort should be made to improve the peaking capacity of plants. In the author's company, oil gas generating capacity has been increased 100% by the use of gas oil. Production and transmission capacity have been increased by butane air gas plants. High pressure transmission line capacity has been greatly benefited by high pressure storage at the ends of the lines.

The liquefaction of natural gas as developed in Cleveland is a noteworthy contribution with respect to providing economical peak load investment. This development may well be integrated with the recovery as by-products of gaseous constituents such as ethylene, propylene, butylene and even methane, ethane and hydrogen.

The future will belong to those gas engineers and companies who are able to adapt their processes to the needs of the market and to overcome the handicaps presented by certain types of load. Gas engineering needs to be coordinated with sales development.

CORROSION AND PROTECTION

Of Buried Metallic Structures

Compiled and Abstracted by GUY CORFIELD, Technical Editor, GAS

3. Pipe Coatings

Use and Abuse of the Holiday Detector

W. H. T. THORNHILL and R. C. STROMQUIST, Wailes-Dove-Hermiston Corp., Westfield, N. J. Highlights from a paper, "Use Limitations and Abuse of the Holiday Detector," delivered at the Bureau of Standards Soil Corrosion Conference, St. Louis, March, 1943.

THE desirability of the elimination of pinholes in a coating applied to pipe lines, to be buried underground, is apparent. Any holiday remaining in a coating on a buried pipe line is a place where corrosion can occur, either as a result of chemical corrosion or by electrolysis. Holidays include pinholes or missed areas or gas pockets where there is little or no coating on the pipe. Stray currents will be concentrated at the holiday and excessive corrosion will occur at that point. If cathodic protection is used as a supplementary means of protecting the pipe, it is important that the coating have as few holidays as possible as these are points where current leaves the line. The holiday detector is unquestionably a useful inspection tool for this purpose.

A holiday detector is a spectacular tool. This may have accounted for the fact that it is frequently felt that any coating material that passes the holiday detector test is always a 100% pipe coating job. This is by no means true. All that the holiday detector was developed for was to discover holidays, and this is all that it should be used for.

There are other causes besides holidays which may be responsible for a coating job that is not entirely satisfactory. For instance, the pipe may not have been properly cleaned prior to the application of the coating materials, or the pipe may have been wet when the primer was applied, or the primer itself may have been applied in too thick a film, or may not have been properly dried at the time the hot enamel was applied. All of these are defects in application and are responsible for very poor adhesion of the hot coating material.

If the hot coating material is not adhering properly to the pipe surface, such coating material will be damaged in handling during laying operations, or will be more readily displaced through pressure or soil stress after burial. Such poor practice in applying any coating material should not be permitted, but obviously the holiday detector will never discover such defects. Such defects in application will have to be taken care of by careful inspection at the time that the various operations are performed on the pipe.

Damage by High Voltage

Another improper use of the holiday detector is to apply too high a voltage to the coating material. High initial electrical resistance is desirable in any coating material. Generally speaking, the higher the initial resistance the better the coating, but even the coating with the highest electrical resistance has an upper limit of resistance to electrical pressure .Any voltage above this limit will naturally cause penetration. In spite of this well known fact, there have been many pipe line coating projects where the coating material was subjected to a much higher voltage than it could withstand without showing a breakdown due to the high electrical pressure. This seems to have been done because of lack of knowledge of what the limits are, or in the mistaken notion that the higher the voltage the better the job. Consequently, so-called holidays were disclosed which really never existed at all. This obviously resulted in considerable extra expense in touching up such areas. Much of the coating, touched up in this way, was absolutely satisfactory, and would have been perfect protection against corrosion.

Perhaps the idea of high voltage came about as a result of the original development of the holiday detector. Since then much has been learned regarding its construction and proper use. When first developed, the holiday detector operated with a copper ring that surrounded the pipe with an air cap of, in many cases, as much as one-half of one inch between the ring and the pipe coating. Under such conditions, high voltages were required merely for the purpose of jumping the air gap between the copper ring and the coating. Additional voltage was, of course, necessary for testing the coating itself. The combination of the two voltages resulted in the rather high figure.

Modern holiday detectors operate with a copper screen that is dragged on the coating, and is in contact with it. All of the voltage that is necessary is to jump through the much smaller air gap equivalent to the thickness of the coating. This is very much less than would be required to jump through one half inch, or even more, of air space.

After all, all that is being tested is the presence or lack of presence of holidays, and not the electrical resistance of the coating material, and therefore, no more voltage should be used than required to detect holidays. Experience has shown that modern holiday detectors operate efficiently and perform the job that they are expected to do when operated at a voltage of 5,000 to 10,000 with minimum amperage. Holidays will be discovered, but, at the same time, coating that is in satisfactory condition will not be harmed.

Operating holiday detectors at too high a voltage is not only unnecessary, but may result in a very substantial and unnecessary increase in the coating cost. For instance, take the case of a pipe line coated with a hot coal tar enamel applied simultaneously with a spiral bonded wrap of 15 lb. Coal Tar Saturated Asbestos Felt, and

a protective spiral wrapping of 80 lb. Kraft paper over the felt wrapper. Assume that the coating is applied at a thickness that will withstand 20,000 volts, and that the felt will withstand 2,000 volts, and the Kraft paper 1,000 volts. Then the total combination should, theoretically, withstand any voltage below 23,000 volts. Theoretically therefore, the holiday detector could be operated at 25,000 volts with no penetration of the combination coating.

Needless Cost and Labor

Suppose, however, that there is a pin hole or break in the Kraft paper, in which event it would have no electrical resistance at this point and consequently, would require no voltage to penetrate it, except the very small amount of air gap represented by the few thousandths of an inch thickness of the Kraft paper. When the holiday detector passes over this particular spot it would indicate a holiday, due to the fact that the holiday detector, theoretically, is operating at 23,000 volts, but at this point the coating combination will theoretically only withstand 22,000 volts. However, by assumption, there is no actual holiday in the coating itself at this point, and the coating will therefore protect the pipe from future attacks from soil corrosion just as well as it would if the Kraft paper had been perfect. Nevertheless, the holiday detector indicates a holiday, due to the defect in the Kraft paper, and consequently the touch-up gang have to repair this so-called defect. This, of course, takes extra materials and extra labor. The same thing is true if at some particular point the coating has no holiday in it and the Kraft paper wrapper is perfect, but there is a weakness of some kind in the felt wrapper. Again a holiday would be indicated which requires the unnecessary use of extra materials and labor, although, as a matter of fact, the coating material itself is in perfect condition and requires no repairs.

Under the above circumstances, the holiday detector is really testing and trying to discover the defects not only in the coating material where such detection and subsequent repairs are absolutely necessary for satisfactory future protection of the pipe line, but is also testing both the Kraft paper and the felt wrapper where the location of defects of this kind is immaterial, in view of the fact that such small defects in no way impair the function of these two materials. In other words, the pipe line felt will satisfactorily act as a shield to the underlying coating whether it has a small hole in it or not. The same thing is true of the Kraft paper.

On the other hand, if the holiday detector is operated at the recommended voltage of 5,000 to 10,000 volts, and there should be an actual holiday in the coating itself, this voltage will penetrate the 3000 volts that the Kraft paper and the felt wrapper will withstand, and also penetrate the air gap at the holiday in the coating.

Sometimes the holiday detector is misused as a tool to indicate coating thickness. It should not be used to detect thin spots in coating, which, in most cases, are not detrimental, as the voltage is much too critical for this purpose. Coating thickness should be determined in other more satisfactory and positive ways. Undoubtedly the use of the holiday detector for this purpose has also resulted in excessive touch-up and consequently extra cost beyond what is necessary to secure a good pipe coating job.

Inasmuch as holiday detector is a simple instrument, some workers have attempted to use it on structures other than pipe lines. There are many structures which, of necessity, are still being coated by means of the Dauber method. This method of applying hot bituminous coatings, while impractical for pipe line work, is still the best known method for applying hot bituminous coatings to other structures, and is used on small jobs where the setup charge for mechanical application of hot bituminous coatings would be out of the question.

Coatings applied by this method can be inspected visually. The coating is not hidden by a wrapper as is the case with most coated pipe lines. There is very little chance to leave any large uncoated areas—about the worst that can happen is thinner coating at the bottom of the brush marks and a few small pinholes. This thin coating may be penetrated by the holiday detector, but this does not indicate that the coating is defective. It only means that such thinner coating will not stand the same voltage as the thicker coating. The coating is not being applied for the purpose of resisting high voltages, but to protect the surface against corrosion, and this thinner coating (which will still be many times the thickness of ordinary cold applied paints) will still satisfactorily do this job.

Experience has shown that thinner coating, or a few holidays, say on the interior of a steel storage tank, or in a coal bunker, or on a lock gate, do not present a serious problem. Corrosion does occur at the pinholes, but the products of corrosion in the case of coal tar base coatings, usually fill up these holidays and retard or inhibit further corrosion.

Some attempt has been made to use holidays on structure that are coated by the Dauber method. Where holiday detection has been specified on such structures, the cost of applying a coating entirely free from holidays, or thinner coating at the bottom of brush marks, cannot possibly justify any benefits derived therefrom. This is a proven fact as there are many applications of hand-brushed hot applied coal-tar enamel in service for 20, 30, or 40 years or more, which are today still adequately protecting the steel even though a few pinholes or thin spots probably did exist in the coating at the time it was applied.

In conclusion, the holiday detector is unquestionably a very desirable, useful and necessary tool for inspection purposes on a coated pipe line, but it should be used entirely for locating holidays. It should not be considered that a pipe line is perfectly coated and protected even if it passes the holiday detector test, and it should not be used as a thickness gauge, or for testing hand brushed hot applications.

Fouling Organisms in Salt Water

WILLIAM F. CLAPP, William F. Clapp Laboratories, Duxbury, Mass. Excerpts from his studies "Fouling Organisms in Salt Water." This article appears in a book, "Protective and Decorative Coatings," edited by Joseph J. Mattiello and published by John Wiley & Sons.

PUBLISHED records of the effect of marine macro-organisms on metals and protective coatings are contradictory. In some cases, marine growth has been recorded as having provided protection to the material beneath. In others, definite deterioration has been attributed to the presence of marine growth.

On any object submerged in salt water, organisms will eventually appear, even though they may not survive. A list of the number of species which might be found on submerged materials would include practically all of the flora and invertebrate fauna present. If such organisms as clams, sea slugs, clam worms, etc., are listed

MINIMUM MAINTENANCE... MAXIMUM PROTECTION...

ANOTHER strategic artery of oil for war! Never before have so many vital pipelines been built with such amazing speed. But even in the emergency there has been no compromise with make-shifts. These pipelines are planned and built to give long years of service.

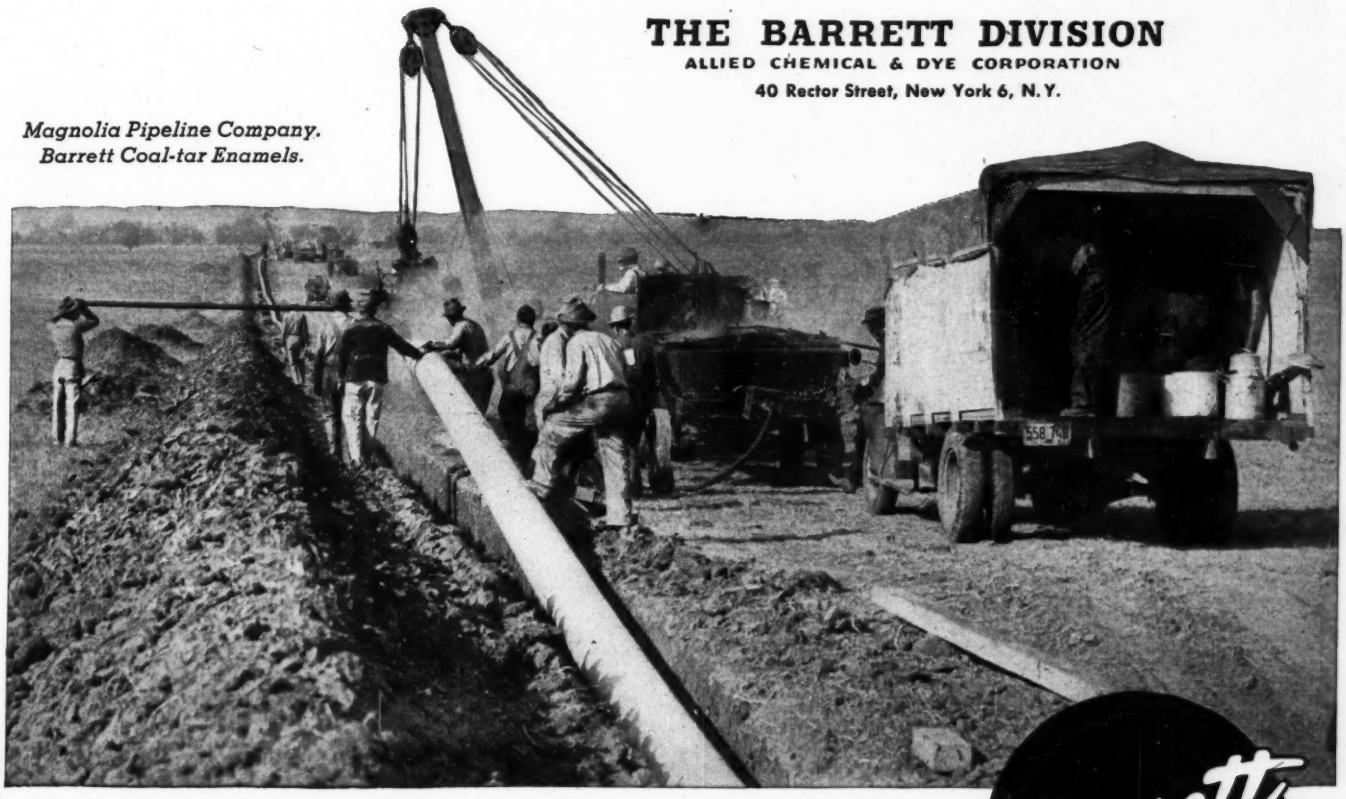
To assure minimum maintenance and maximum protection, the builders specified Barrett Coal-tar Enamels—those used on the longest and largest oil pipelines in the world . . . "Big Inch" and "Little Big Inch."

Engineers have discovered that Barrett Enamels can be applied easily and quickly in all sorts of weather—an important factor in speedy construction. Also, Barrett Enamels resist underground acids, alkalis, and electrolysis, and withstand unusual conditions of stress in all varieties of soil.

Again and again, Barrett Enamels have demonstrated that they meet all requirements of the most exacting users, and at the lowest possible cost.

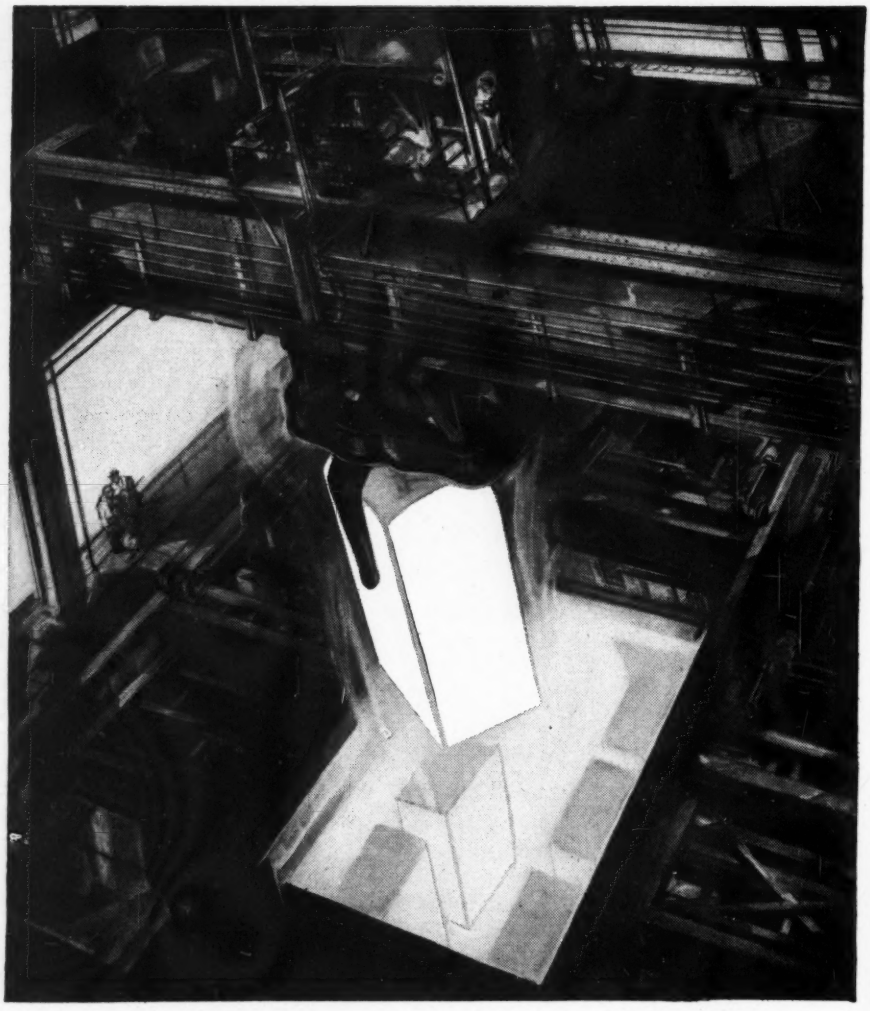
THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N.Y.

Magnolia Pipeline Company. Barrett Coal-tar Enamels.



FIELD SERVICE—*Our Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett Enamel.*

Barrett
COAL-TAR ENAMEL



BAPTISM OF FIRE
FOR STEEL INGOTS

The baptism of fire that steel ingots receive in the great gas-fired furnaces, known as soaking pits, conditions them for further processing. It is one of the many applications of heat in the production of steel. For heat is the agent that reduces raw materials into iron, converts iron into steel, helps shape and finish steel into the infinite number of forms in which it serves.

In the manufacture of steel, great progress has been made in the study, analysis, and control of heat. The attention paid to the application of heat is as careful as that paid to the scientific determination of the materials used in producing steel, the most useful of metals—steel to arm our fighting men with superior weapons—steel in abundance for broader peace-time employment.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA
J&L STEEL

CONTROLLED QUALITY STEEL FOR WAR

SOAKING PITS

Holes in the ground were the first device for evenly distributing throughout the steel ingot, the heat from its molten interior to its solid exterior, to make it ready for rolling. John Gjers, Swedish-born steel engineer of England, in 1882, seeking to avoid time-wasting, costly practice of allowing ingots to cool and then reheating them to rolling temperatures, placed each ingot in a brick-lined, covered hole in the ground. These heat-retaining holes, forerunners of modern, complex steel ingot-heating furnaces, were called "soaking pits." The holes have long been obsolete, but the name lingers on.

Gjers' idea was successful from the start and the new practice spread from England to the Continent and to the United States within a dozen years. The Henry Bessemer medal was awarded Gjers in 1894 by the British Iron and Steel Institute "for great service" to the industry by his soaking-pit invention and other improvements in iron and steel production.

The baptism of fire given steel ingots today in modern, intricate, scientifically heat-controlled and skilfully tended ingot, heating furnaces, is a far cry from the holes in the ground put to use by the son of a Swedish army officer in England back in the 80's. The soaking of ingots in pits is one of the most important steps today in the march of steel from iron ore to finished product. Without soaking pits there could not have been the present record production of steel for war—90,000,000 tons last year in the United States, more than all the rest of the world.

Shriller than a bo'sun's in a gale, is the whistle piercing the deep undertones of a steel mill that is the signal to start ingots coming up from the soaking pits to the blooming mill to be rolled into long blooms or wide slabs. After this first rolling, the steel passes on through other mills and other processes to wind up in many sizes, shapes and grades adaptable for manufacture of countless articles useful in peace, as well as war.

Only 15% of surgical instruments sold in this country before the war were made here. Now most instruments and hospital equipment for our armed forces are American made. The industry is producing about 60,000 tons of special steels for some 5,000 applications required by Army and Navy Medical Corps. This entailed learning how to achieve production of many highly specialized steels formerly imported from Europe.

Conquering new horizons in metallurgy since World War I, American scientists have put the U.S.A. far ahead in production of better industrial steels, and in development of super-fine special steels. For example they have (1) Created new high temperature and corrosion-resistant steels for hospital and laboratory; (2) Helped make possible the mass fabrication of these steels into surgical instruments of unparalleled efficiency; (3) Materially aided vast life-saving developments within the pharmaceutical industry.

as "fouling" it follows that practically any marine invertebrate might be included, because the organisms mentioned are only optionally present. A list of all organisms which might be found on the bottom of vessels in salt water would therefore be of no practical value.

It would seem that the term "fouling organisms" when applied to marine growth, should be restricted to those species which are capable of forming a more or less secure attachment, or which may contribute a more or less adherent deposit to a material.

Most authorities agree that the first to find attachment are the marine bacteria. In any event, all marine organisms which might be considered as fouling—in other words, all organisms which might be found on any material submerged in salt water—can be divided into one or another of two large distinct groups.

Group 1: The Uni-cellular micro-organisms composed of many species of Bacteria and other plant life, and various types of Protozoa.

Group 2: The macro- or multi-cellular organisms, both plant and animal.

Film Forming Organisms

The micro-biological film-forming organisms appear quickly on almost any materials submerged in salt water. In fact, most species of film-forming bacteria do not thrive or multiply rapidly until they do become attached to some base. Many observations indicate that the multi-cellular, fouling organisms rarely secure a firm foothold on any surface until after the formation of an organic film. The point of attachment for the larger organisms may therefore be said to be not in direct contact with a material but separated by a film which is to some extent organic.

In order to understand the effect of the various species of macro-organisms on different materials, some knowledge of the nature of the organic film is necessary, since the firmness of attachment of the larger organisms must depend to some extent upon the adhesion of the organic film. The major portion of this film is made up of numerous forms of bacteria, but some fungi, molds, diatoms and protozoa are also generally present. Most of the bacterial portion of the film is composed of colonies formed from single individuals which have become securely fastened to the surface, rather than by the addition of later arrivals.

In normal salt water, the surface of most materials may be completely covered with a micro-biological film in a very few hours. Scores of different forms of film-forming bacteria are known, but not all marine bacteria are film-forming.

Guy Corfield

THIS DISCUSSION of Pipe Coatings is continued from the July issue of GAS. Other topics in this series which have been covered in previous issues are (1) Electrical Potential Phenomena (January, February, March); (2) Corrosion Coupons (April and May). (3) Pipe Coatings (June and July). The series will continue with sections devoted to Cathodic Protection, Theory and Research; Cathodic Protection, Application; Miscellaneous—Soil Surveys, Special Problems, Anaerobic Corrosion.

Technical Editor GUY CORFIELD is research engineer for Southern California Gas Co., a member of the AGA subcommittee on Pipe Coating and Corrosion, and a director of the National Association of Corrosion Engineers.

The nature of the attachment of the bacterial colonies is not thoroughly understood, but some appear to secrete or exude a film of gelatinous or mucilaginous material which soon hardens and in which they are then partially embedded. Even on polished glass, swiftly running water will not remove this film once it is formed.

In addition, certain forms of denitrifying bacteria are known to precipitate calcium carbonate from salt water. This may account for at least some portion of the very adherent calcium carbonate coatings found on metals submerged in salt water, occasionally even on the very high copper alloys. Sulphate reducing bacteria are also plentiful in some micro-biological films.

Iron bacteria commonly found in micro-biological films do not appear to affect ferrous metals directly, but do precipitate iron which is already in solution. Certain bacteria are also believed to be responsible for deposits of silica occasionally found on ferrous metals.

There is a considerable variation in the numbers of film-forming organisms present at different locations. This may be due to some forms of pollution, to differences in salinity, or other local factors.

There is also a very marked seasonal variation in the number of film-forming organisms at a given location, temperature being the most important factor governing this variation.

The micro-biological film on metals cannot always be considered as composed entirely, or even mostly, of the organisms originally responsible for the film. Turbid waters containing more or less microscopic organic and inorganic material in suspension may deposit some portion of this material upon a micro-biological film, thus building a composite film of a structure very different in nature from the original purely biological film. Additional living micro-organisms may form a new film over this microscopic detritus. In comparatively thick films, the organisms in the earlier layers may die and the product of this decay may be corrosive or injurious.

Corrosion products may also contribute to and affect the film in several ways. Heavy deposits of a more or less adherent corrosion product may result in the death of the micro-organisms. This is particularly true with iron and mild steel since in these metals the corrosion product appears as quickly as the organic film. In copper the corrosion product is not adherent. It is therefore possible that the corrosion of copper or the high copper alloys may affect the micro-biological film by providing a very insecure non-adherent base for attachment, as well as providing a condition highly toxic to the organisms.

Physical Nature of Surface

The condition or nature of an exposed surface affects the firmness or permanence of attachment of an organic film. Even on polished glass, a very adherent continuous micro-biological film of measurable thickness may be built up in 24 hours.

Different metals, alloys, and protective coatings, offer very different surfaces for the attachment of the film-forming organisms. Most of the irons and mild steels do not provide an even smooth surface when compared with the various stainless steels, copper alloys, monel, aluminum, etc. It can be seen that many factors may affect the micro-biological film on metal or protective coatings.

A complete biological film may be considered as protective, but if broken or incomplete, accelerated corrosion may be expected where a metal is more or less exposed, similar to the effect produced by failures in protective coatings.

It is known that on some surfaces, certain encrusting organisms are protective. It is also certain that many of the encrusting and fouling organisms accelerate deterioration. The accumulation of data in recent years indicates that organisms play a very important part not only in their effect on metals, but also in their effect on protective coatings.

Many theories have been offered to

explain the deteriorating effect of the various encursting macro-organisms. Some may be enumerated as follows:

1. That some secrete an acid or a corrosive fluid.

2. That the powerful digestive fluids of the stomach and alimentary canal of some marine invertebrates may accelerate deterioration.

3. That while the living organisms may be protective, the products of decaying animal matter may cause excessive deterioration.

4. That the encrusting organisms may form semi-permeable bases which favor the development of concentration cells, resulting in corrosion either directly beneath or around the periphery of the base of the organisms, depending on the type of concentration cell that develops.

Encrusting Organisms

Authorities are in complete disagreement in their opinions regarding the effect of some encrusting organisms such as the various species belonging to the genus Galanus (certain barnacles). Many encursting organisms such as Ostrea (oysters) and Balanus eburneus may appear consistently to provide some protection against deterioration on a certain material. But these and many other organisms grow very rapidly under favorable conditions. Weaker organisms or later arrivals are frequently covered and killed by more rapidly growing neighbors. Decay resulting in the formation of sulphur compounds may accelerate deterioration or the failure of a protective coating, and a normally protective organism may become indirectly responsible for the corrosion of a metal or the deterioration of a paint film.

Failure of protective coatings due to encrusting organisms is also frequently caused by the mechanical strain on the paint system by the growing organism. This is particularly true with most species of Balanus. The embryonic Balanus starts adult life by excreting a minute calcium carbonate base which it firmly attaches to the surface upon which it rests. As it grows this base is rapidly enlarged, horizontally. In constructing the base it is evident that there is considerable mechanical downward pressure exerted as well as horizontal, to the extent that the organism when fully grown is embedded to a greater or lesser extent in the paint surface. In the case of some heavy bitumastic coatings, Balanus have by this means, while growing, gradually forced the base completely through 1/8 in. or more of the coating in such a manner that the entire outer circumference of the Balanus base is finally forced through to a firm contact with the bare material beneath.

It has also been observed that the stress developed in the growth of the organism may affect a protective coating to the extent that when the organism is removed or falls off, it carries with it the entire paint system which is directly beneath the base, while in the area surrounding the organism, the paint remains firmly attached.

Exposure Tests

In a very large majority of all salt water exposure tests which have been conducted on metals and on protective coatings, the materials have been examined and the results recorded only after comparatively long periods of exposure.

Eventually so much has happened on a submerged test panel that it is very difficult to determine which organism or what condition may have been responsible for any corrosion found on a metal, or deterioration in a protective coating. In most cases so much activity has occurred on the tests that it is only possible to record what has happened. To determine why, is practically impossible. The investigator can only speculate on the probable cause. The factors are so numerous and conditions so variable that we have practically no definite data concerning the effect of specific organisms on metals submerged in salt water.

High School Boys Dig for Southern Counties

TWENTY-ONE Santa Barbara, Calif. 15 and 16-year-old high school students are spending their vacations digging and shoveling for the local Southern Counties Gas Co. which is overhauling and reconstructing some of its underground pipelines.

Through the cooperation of the high school authorities and with the supervisory aid of one of the teachers who rolled up his sleeves and joined the boys, Southern Counties solved its manpower problem.

Now the boys are doing men-size jobs. They like it! It's tough work, hard on the back and rough on the hands. But the pay is good. They get 75c an hour and time-and-a-half for Saturday on a six-day work schedule.

Just to make sure that the lads are properly handled Paul Davidson, teacher of social studies at the high school, was asked to join up in the summer program and be the boys' boss. George Smith, manager of the Southern Counties office stressed the fact that Davidson was chosen because of his experience in handling youths. Now all orders and requests upon the boys are made through Davidson.

Before the youngsters went out on the job they were given a virtual indoctrination course in safety precautions and in the use of various tools. After a week's work on the street there still were no accidents and the boys handled their tools like veterans.

Davidson admitted the boys do engage in some horseplay. But they get the work done. They're excavating, tunneling through, laying 2-in. copper-tubing for seven blocks and helping to remove old cast iron pipes.

These teen-age boys are having a good time this summer, earning money, getting in shape for the coming high school football season, and helping Southern Counties Gas Co. solve its manpower problem.

Canadian Leases Unsold Under "Royalty Bonus" Plan

According to a report from Calgary, the Alberta government's plan to offer oil and gas leases by public tender on a "royalty bonus" basis received a setback when the date of the initial sale, July 12, passed with no sale recorded. If any bids were made, they apparently were not acceptable.

The July 12 sale involved 3440 acres in Calling Valley and was the first calling for a royalty instead of a cash bonus. Major and independent members of the Alberta Petroleum Association, claiming acceptance of the royalty bonus principle might prove an opening wedge for a general rise in crown royalty levels, agreed NOT to submit bids, despite the fact that several companies definitely are interested in the area covered by the Calling Valley leases.

In announcing its intentions, the government stated that if no acceptable bids were received, the lease would be withdrawn as Crown reserves.

THE UNDERGROUND STORAGE OF GAS

A Resume of the Principal Projects in the United States and Canada

By E. G. DAHLGREN

Technical Secretary, Research and Coordinating Committee
Interstate Oil Compact Commission

IN 1942 the Research and Coordinating Committee of the Interstate Oil Compact Commission made a survey of production, conservation, and utilization of natural gas in the member states. In its report presented at the 1942 autumn quarterly meeting at Chicago, the Committee recommended the greater use of depleted or near depleted oil and gas reservoirs for natural gas storage and conservation.

Subsequently, in 1943 the Committee decided to collect information on underground natural gas storage projects which culminated in the preparation of a report entitled "A Survey of Underground Natural Gas Storage Projects in the United States" which was published in the October 1943 Interstate Oil Compact Quarterly Bulletin. At the winter quarterly meeting in December, 1943, the Committee decided to bring the survey up-to-date.

The writer is presenting this paper in behalf of the Research and Coordinating Committee.

Oklahoma

For information on underground storage projects in Oklahoma the writer is greatly indebted to the following individuals: E. J. McConnell, chief engineer, Oklahoma Natural Gas Co.; M. J. Kirwan, manager of production, and Fred J. Lichtenheld, district engineer, Cities Service Oil Co.; R. A. Hendricks, Department of Economics, Phillips Petroleum Co.

Oklahoma Natural Gas Co.: This company at Tulsa has prepared itself for sudden peak demands during this 1943-44 winter season with their Osage Gas Storage reservoir located in Sections 21, 28 and 29, Township 20 North, Range 12 East, Osage County. The reservoir is located within two miles of the Tulsa city limits.

Studies of this field were begun in 1941 and resumed in the latter part of 1942 regarding the feasibility of underground storage. The company had produced over 2½ billion cu. ft. of gas from the field from 1922 through 1928.

The studies were completed in February, 1943, and it was concluded that it would be practical to utilize the depleted Burgess Sand formation, at a depth of 1600 ft., for storage purposes. This formation was productive in the period of 1922-1928.

The storage area is located on Osage Indian lands, the mineral rights of which are held in common by the tribe under the supervision of the U. S. Department of Interior.

The first of five wells to be drilled in the storage area was begun on March 16, 1943, and completed on April 17, 1943. The fifth and last well was completed July 16, 1943. In four of the wells, the Burgess sand was cored to provide valuable information for future study of the reservoir and in three instances cores were taken from other production formations located above the Burgess sand.

Anticipating the need for starting the storage of gas as soon as possible, an 8-in. transmission supply line, four miles long, was constructed in March, 1943. Injection of gas into storage was started almost immediately after the completion of the first well on April 20, 1943, and was continued throughout the spring and summer. As of July 31, 1943, there was placed into storage 518,000 Mcf cu. ft. of gas and the reservoir pressure had increased from an initial pressure of 13 psi to 121 psi. On December 1, 1943, the volume in storage was 1,209,000,000 cu. ft. and the reservoir pressure was 230 psi.

During the current winter a limited amount of gas was used from the storage; the peak rate of delivery being around 15,000,000 cu. ft. per day.

Oklahoma City Field: In the Oklahoma City field the Cities Service Oil Co. has used the Layton Sand of Pennsylvanian Age intermittently since 1938 for underground natural gas storage. The main purpose in storing the gas was to conserve residue gas in a period of low markets. Excess gas, produced incident to oil production, has been pumped into the input wells instead of dissipating the gas to atmosphere. The storage has been used advantageously during this winter. No particular difficulty has been encountered in introducing the gas into the sand formation and no difficulty has been experienced in obtaining production of this gas.

The input wells have been the Oklahoma City No. 1, the discovery well of the field which was plugged back to the Layton zone; the A. Bodine No. 1, and the R. Jennings No. 1.

No new data are available on the Phillips Petroleum Co.'s Sullivan No. 1 well in the Oklahoma City field. This well receives excess gas from the nearby Phillips natural gasoline plant.

Phillips Petroleum has been experimenting during the past five or six years in the underground storage of butane in the Wilcox, Layton and Hoover zones of the Oklahoma City field. Liquid butane has always been injected into the sands; both liquid butane and butane vapor have been recovered from the input wells at various times.

Other Projects: No new developments are available on the underground storage project operated by the Southwest Natural Gas Co. of Ada, Oklahoma. This storage area in a depleted natural gas field north of Ada has been used since 1928.

The Northern Oklahoma Gas Co. of Ponca City is still attempting to

---

E. G. Dahlgren

E. G. DAHLGREN last month was appointed acting secretary of the Interstate Oil Compact Commission, succeeding Mr. Charles L. Orr. Since 1942 he has been secretary of the Technical Committee of the Commission and a few months ago was appointed assistant secretary of the Commission. Before coming with the Commission he had been with the PAW and SEC in Washington, and for a time served as director of the Conservation Commission of the Kansas Corporation Commission, and with the Oklahoma Corporation Commission.

The first portion of this article, summarizing the underground storage facilities in Arkansas, California, Kansas, Kentucky, Michigan, New Mexico, New York, Ohio appeared in the July issue of GAS, page 29. Mr. Dahlgren's articles were introduced by a general article on Underground Storage by J. FRENCH ROBINSON, presented in GAS, June, 1944, p. 29.

find a depleted reservoir suitable for underground storage. All areas studied have indicated defects which would jeopardize storage operations.

The Consolidated Gas Utilities Corp. of Oklahoma is also attempting to find suitable underground storage reservoirs.

Pennsylvania

Information on underground natural gas storage projects in Pennsylvania has been furnished by the following individuals: John J. Jacob, Jr., vice president and manager, and Fenton H. Finn, chief geologist, The Peoples Natural Gas Co.; E. O. Schillhahn, geologist, The Manufacturers Light and Heat Co.; H. L. Applegate, assistant to president, Carnegie Natural Gas Co.; Geo. E. Welker, president, United Natural Gas Co.; J. V. Goodman, geologist, Pittsburgh and West Virginia Gas Co., Pittsburgh, Pa.

Consolidated Natural Gas Co. subsidiaries: Information contained in a communication from Mr. Finn (June 8, 1943) indicates at least 20 underground storage areas were in use in Pennsylvania and approximately five more areas were being prepared for storage use at that time.

The Peoples Natural Gas Co. of Pittsburgh and the New York State Natural Gas Corp., subsidiary companies of the Consolidated Natural Gas Co., operate six storage pools in Pennsylvania. Peoples Natural operates the Murrysville, Gamble-Hayden, and McKeesport pools in Allegheny County, the Oakford Pool in Westmoreland County, and the Colvin pool in Washington County. The New York State Natural Gas Corp. which operates the East End-Tioga pool in Tioga County, is a gas producing and transmission company and sells its gas at wholesale to other gas companies, principally to those companies which distribute gas at retail in Syracuse, Cortland, Ithaca, Auburn, and other communities in western New York State.

The Manufacturers Light and Heat Co.: This Pittsburgh utility operates five storage fields in southwestern Pennsylvania. In 1943, the Heard field storage located in West Finley Township in Washington County was put in operation. The field covers 1949 acres with 21 wells. The storage reservoir is a sand trap with several sands. In January, 1944, according to Mr. Schillhahn, a total of 117,000 Mcf was in storage with the daily average delivery to storage at 3600 Mcf and 3000 Mcf the daily average delivery from storage.

Mr. Schillhahn advises that there is no change in the statistics pertaining to the McKinley pool in Elk County, and the Cross Creek, Donegal, and Majorsville pools in Washington County. The Majorsville pool also extends into Greene County and Marshall County in West Virginia.

The United Natural Gas Co., according to Mr. Welker, inaugurated its first storage project for regulating certain pipe line pressures in 1922.

In 1929 the first major storage of seasonal gas was developed, and since that time experiments have been made in a number of additional areas. Four of the more suitable were selected and developed by United Natural and its affiliate, The Sylvania Corp.

These storages have been successfully operated, and have resulted in a number of benefits, of which the major ones are:

1. The conservation of natural gas from highly competitive areas during periods of abundant supply for withdrawal and sale during periods of excessive demand.
2. The seasonal storage of gas during the summer months as an auxiliary source of supply in winter peaks.
3. The profitable operation of small wells every day in the year and making this gas available during times of large demands, thus turning what would be unprofitable producers into profitable ones.
4. Providing a means of meeting peak demand by increasing the system's deliverability when such demands occur.
5. Absorbing daily and hourly fluctuations in demands by permitting them to "ride on the line."

The maximum volume stored in these storages to date approximates 2¼ billion cu. ft. At the present time, a total of 122 wells are operated for storage purposes in these projects.

No new information is available on the North Penn Gas Co. storage reservoir in the Farmington field in Tioga County.

The Carnegie Natural Gas Co. operates a small storage field of approximately 300 acres located on the west side of the Monongahela River, southwest of the City of Clairton in Allegheny County. Gas was first pumped into this field in July, 1938. Very little has been done since that time. Approximately 100 million cu. ft. of gas is in storage at the present time.

The writer has been unable to obtain definite information concerning the storage of stove and coke gas in the McKeesport gas field near Pittsburgh.

Equitable Gas Co.: The Equitable Gas Co. operates the Tepe Unit, which is located in Jefferson Township, Allegheny County, on Peters Creek at Large. The unit consists of two separate and distinct pools, namely the Veronic Pool, which is composed of two producing wells, and the Beedell, which consists of five producing wells. Both pools produce from the Fifth Sand.

Gas was first put into the Beedell pool October 2, 1936, at which time the rock pressure was 7 lbs. After experimenting it was decided to repair 3 of the 5 wells, namely wells 3838, 3840, and 3842. Wells 3840 and 3842 had 5 3/16 in. casing, which was cemented in. Well 3838 was plugged back to the Fifth Sand and in order to open up the sand face considerable work was done in the form of shotting, washing with fresh water, and cleaning out. At present, well 3834 is producing through the original 4-in. tubing with a 6⅝ by 4-in. anchor packer, and well 3839 is producing through the original 3 in. tubing with a 6⅝ by 3-in. anchor packer.

In the Veronic pool, gas was first injected August 1, 1937, when the rock pressure was 13 lbs. Well 3835 is producing from the original 5 3/16 in. casing, which was cemented in. In September, 1939 the original 6⅝ in. casing of well 3836 became defective and it was necessary to kill the well with aquagel and to insert 1175 ft. of 4-in. tubing.

It is estimated that these two pools cover an area of 245 acres. Due to lack of records on gas pay thickness, the average thickness is estimated between 4 to 6 ft. No cores were taken to determine the permeability or porosity of this sand. From operating conditions, it is assumed that both pools consist of an area of high permeability, as the differentials in rock pressure adjust themselves readily throughout the whole pool.

The Finleyville Unit is located in Union Township, Washington County, on the waters of Lobbs Run, about a mile east of Gastonville. The unit comprises two separate and distinct pools. The Urbanick Well No. R-65 comprises one pool and the Houston, Denniston and Stillie wells comprise the other pool. Both pools are producing from the Fifth Sand.

Gas was first injected into the Urbanick pool November 3, 1934. It was injected into the Houston, Denniston, and Stillie pool February 28, 1935.

The Bunola Unit is located in Forward Township, Allegheny County, on the Monongahela River about two miles southwest of Elizabeth. This pool consists of two producing wells which are drilled at the site of the old original Wright well which was at one time the largest producing well in the Appalachian field. Gas was first injected into this pool June 23, 1938.

Texas

L. T. Potter, superintendent of production, Lone Star Gas Co., has kindly contributed data pertaining to their Cheaney field storage project in Eastland County and their Petrolia field storage project in Clay County.

Mr. Potter has covered the operations of the Cheaney field storage in his AGA paper presented in 1940. The paper presented production data from the wells to August 31, 1938. In the period March 31, 1936 to August 31, 1938 a total of 1,188,255 Mcf had been injected and a total of 1,338,636 Mcf was returned. No gas has been stored in the field since November 4, 1937.

In the period from September 1, 1938 to January 1, 1943, the following amounts of gas have been produced from the field.

	Production Mcf
1938	147,396
1939	364,962
1940	286,784
1941	254,178
1942	222,994

The Petrolia field storage is now inoperative insofar as storage is concerned, although the wells are still producing at nominal rates.

Storage operations were commenced in 1929 on the Miller farm. Gas was obtained from the Chickasha, Shamrock and Petrolia fields. As of November 1, 1937, a total of 1,807,580 Mcf of gas had been injected. The total return during this period amounted to 1,304,624 Mcf or 72.2% of the total storage. The Miller wells have returned only 936,989 Mcf, but an additional 367,635 Mcf of stored gas has been recovered from the seven border wells. No gas has been stored in the Petrolia field since 1941.

West Virginia

Information on West Virginia underground natural gas storage projects has been furnished by the following individuals: G. W. Harr, manager, Gas Department, and H. C. Ice, geologist, Monongahela West Penn Public Service Co. of Fairmont; L. L. Tonkin, president, Hope Natural Gas Co., Clarksburg; and H. J. Wagner, chief, Gas Section, West Virginia Public Service Commission, Charleston; J. V. Goodman, geologist, Pittsburgh and West Virginia Gas Co., Pittsburgh.

Information received from Mr. Wagner indicates 10 storage projects were in operation as of December, 1942. These projects were operated by the Hope Natural Gas Co., the Manufacturers Light and Heat Co., Pittsburgh and West Virginia Gas Co., United Fuel Gas Co., and the Monongahela West Penn Public Service Commission.

Hope Natural Gas Co.: Four storage projects in West Virginia, consisting of two large projects and two small projects are operated. They are known as Bridgeport, Fink, Katy Lick and Crow's Run.

The company first started experimenting with the storage of natural gas in May, 1932 by testing a well in the Bridgeport District which was producing gas from the Fifty-foot sand. Various tests were made with this well from time to time, as well as with other Fifty-foot wells in the area and it was found that the territory was divided into two pools, both in the same sand but definitely separated. These pools are now known as the Northern and Southern pools of the Bridgeport Storage Project. The Northern pool contains 16 wells and the Southern pool has 10 wells.

The Bridgeport Storage was first established as a project on July 1, 1936. The area has been used as a storage project each year up to the present time.

Input tests were made of Gantz sand wells in the Fink Storage area in March, 1938 and it was found that these wells were adaptable to the storage of gas. A Gantz sand oil field lies directly west of the Fink gas field and during the preliminary tests, it was found that there was a certain migration of gas toward these oil wells. When it was decided to make the Gantz gas field a definite storage project, it was necessary to make an agreement with the owners of the oil wells providing for the return to the Hope of storage gas, which had migrated to those oil wells. The oil company was benefitted as it had a large increase in the oil production. Later, the 124 oil wells were purchased by the Hope Natural Gas Co. and the oil wells affected by gas storage are operated as part of the storage project.

Initial operation of the Fink-Gantz sand area as a storage project was started May 1, 1941 and has been continued up to the present time. The Gantz sand area contains a total of 55 Gantz sand gas wells, 23 of which have been used as input wells. Forty-one oil wells have been affected by the migration of storage gas.

Input tests were made of wells producing from the Maxon sand in the Katy Lick area in February, 1938, at which time 132,000 Mcf was stored in the Maxon sand. This is a small area, containing only 3 active Maxon wells.

The Maxon area at Katy Lick was established as a definite storage project in August, 1942, and has continued as such up to the present time.

The Crow's Run Storage area was first tested as a possible storage project in May, 1940, using one well in the Injun sand as an input well. This is a small area, containing an estimated 1200 acres and 4 active Injun wells.

The Crow's Run Storage area was first established as a definite storage project in June, 1941, using as input 3 wells which had an average prestorage rock pressure of 100 lbs. The Injun sand area has been used as storage project up to the present time.

For several years prior to 1936 consideration had been given by The Monongahela West Penn Public Ser-

Bibliography of Underground Storage Studies

Finn, F. H., Chief Geologist, The Peoples Natural Gas Co., Pittsburgh, Pa., in collaboration with J. B. Corrin, Hope Natural Gas Co. and J. J. Schmidt, The East Ohio Gas Co.—Problems of Underground Gas Storage from the Experience of Consolidated Natural Gas Co.

Young, Geo. S., vice president Columbia Engineering Corp., New York, N. Y. and J. E. Overbeck, gas measurement engineer, Columbia Engineering Corp., Columbus, Ohio—Columbia System's Underground Gas Storage Operations.

Isherwood, J. H., vice president and general manager, North Penn Gas Co., Port Allegany, Pa.—Natural Gas Underground Storage Northern Pennsylvania.

Reeves, J. R., general superintendent natural gas, Republic Light, Heat & Power Co., Inc., Buffalo, N. Y.—Underground Storage of Natural Gas in the Medina Formations of Western New York.

Newlon, John H., geologist and superintendent of production, The Equitable Gas Co., Pittsburgh, Pa.—Our Experience with the Underground Storage of Natural Gas.

Fort, M. L., superintendent compressor plant and pipe line operations, Pacific Lighting Corp., Los Angeles, Calif.—Underground Storage of Natural Gas in the La Goleta Field.

Studt, C. W., manager of production, Union Gas System, Inc., Independence, Kans.—Underground Storage of Natural Gas (Union Gas System, Inc.)

Kubista, W. R., engineer, Oklahoma Natural Gas Co., Tulsa, Okla.

Howell, Frank D., general superintendent, Dominion Natural Gas Co., Ltd., Brantford, Ontario, Canada; president Canadian Gas Association.

A more complete bibliography on underground storage has been compiled by the Interstate Oil Compact Commission. Articles published over the past 20 years are therein listed.

vice Co. to the underground storage of natural gas in the shallow Gas Sand horizon near Farmington, West Virginia.

The Pitzer Storage contains about 125 acres. The depth of the Gas Sand at both wells is 1150 ft. and the original rock pressure in the lense was 250 lbs. when the wells were completed in 1916. When storage began in September 1936, the pool rock pressure averaged about 48 lbs. and each well had an open flow of approximately 42,000 cu. ft. per day.

The accumulated total of gas stored to date is approximately 100,000 Mcf. Withdrawals for short periods during the extremely cold winters of 1936 through 1943 total 12,500 Mcf, leaving 87,500 Mcf in storage to date.

The writer has been unable to obtain any information pertaining to the underground natural gas projects operated by the Pittsburgh and West Virginia Gas Co. and the United Fuel Gas Co. The Twenty-ninth Annual Report of the West Virginia Public Service Commission reports approximately 1,735,000 Mcf stored underground in 1941 by the Pittsburgh and West Virginia Gas Co., and 482,435 Mcf stored in 1941 by the United Fuel Gas Co.

Equitable Gas Co.: The Skin Creek (Bennett) Unit is located in Court House District, Lewis County on the waters of Skin Creek, approximately a mile southeast of the company's Skin Creek Compressing Station, 5 miles south of Weston.

This pool consists of two producing gas wells.

Gas was first injected into this pool March 1, 1936 at which time the rock pressure was 31 lbs. After several months of experimentation with input and output of gas, it was decided to recondition the well by withdrawing the original 3-in. tubing and packer and inserting a string of 5 3/16-in. casing, which was cemented.

It is estimated that the pool extends over an area of approximately 170 acres.

The Booths Creek (Comet) Unit is located in Booths Creek District, Taylor County, on the water of Hustead Run at Meadland. The pool consists of four producing wells.

Gas was first injected into this pool on April 13, 1936, at which time the rock pressure was 16 lbs. It is estimated that the area of this pool is approximately 606 acres.

Alberta, Canada

The underground natural gas storage project in the Bow Island field in Alberta, Canada has attracted widespread interest. P. D. Mellon, general superintendent and chief engineer, The Canadian Western Natural Gas, Light, Heat & Power Co., Limited, has furnished information which supplements his excellent paper describing the operations of the Bow Island Field.

Approximately 12 billion cu. ft. were stored in nine years. Thus far no withdrawals have been made from the reservoir.

The shut-in pressure has declined approximately 11 lbs. since the termination of operations in 1938. This drop might be accounted for by the fact that each winter all of these wells are opened and the pressure is equalized throughout the field lines against a main control valve and field regulator station where at a moment's notice this gas can be turned into the system as an emergency supply. In the spring when the wells are closed again and the field lines emptied, the amount of gas so removed from the wells may be responsible for this slight drop in rock pressure.

Recent information indicates that excess gas from the Turner Valley Field may be stored again in the Bow Island field or returned to the gas cap of the Turner Valley field.

Underground storage of natural gas has been demonstrated to be a necessary adjunct of natural gas and petroleum companies in providing emergency reserves for meeting peak demands and meeting the needs of true conservation in eliminating wastage.

Unitization or cooperative operation of storage reservoirs is desirable to eliminate possible wastage and to save manpower and equipment.

Long distance pipe lines are benefitted by the usage of storage reservoirs to enable lines to be operated at full capacity for economical operation.

ACKNOWLEDGMENTS

The writer acknowledges the assistance of the individuals mentioned in this paper who kindly furnished information. Without the cooperation and assistance of these individuals, the writer could not have gathered the information.

Appreciation is expressed to Mr. J. B. Wilson, Assistant Technical Secretary of the Research and Coordinating Committee, for his assistance in assembling the data.

The writer thanks the members of the Interstate Oil Compact Commission and the Research and Coordinating Committee for permission to prepare this paper.

OTHER REFERENCES

1. A Bibliography on Underground Storage, Interstate Oil Compact Quarterly Bulletin. October, 1943, pp. 65-80. (71 references, prepared by Technical Department, Tulsa Public Library, Tulsa, Oklahoma.)

2. J. French Robinson, "The Storage of Natural Gas," West Virgina Engineer, The West Virginia Society of Professional Engineers, Charleston, February, 1944, pp. 18-21.

3. "Special Study, S-325, Playa Del Rey Gas Storage Project," California Railroad Commission and California Department of Natural Resources, July 20, 1942, 25 pages.

4. John A. Thompson, "Oriskany Depletion and Resulting Practices," West Virginia Department of Mines, Oil and Gas Section, Quarterly Report, January-September, 1943, pp. 1-6. (Paper originally presented at Spring Meeting of the Eastern District Division of Production, American Petroleum Institute, Pittsburgh, Pennsylvania, April 17-18, 1941.)

5. O. D. Hall, "Storing Gas Underground." *GAS*, Dec., 1943, p. 38.

PAW Eases Restrictions On Gas Well Drilling

Federal restrictions on the drilling and equipping of oil and gas wells throughout the United States were eased by Deputy Petroleum Administrator Ralp K. Davies.

This action was taken by amending a formal order (Petroleum Administrative Order No. 11), which controls the use of critical materials in petroleum production and natural gasoline recovery operations. It does not affect the supplementary orders to PAO-11, which regulate drilling in specified sections of the country.

The salient changes in the new order, effective nation-wide, are:

1. Restrictions on the drilling of dry gas wells, which have been in effect since March 30, 1943, have been modified. Now, a gas well may be drilled anywhere in the United States, if the well is the only drilling or producible well located on a unit consisting of 640 contiguous surface acres. (This provision does not apply to areas that have been designated by PAW as "restricted areas".) The well must be located at least 1320 ft. from every lease, property, and subdivision line separating unconsolidated property interests, and must be at least 3960 ft. from every other drilling or producible well. Previously, the only gas wells that could be drilled without exception to PAO-11 were those allowed by Supplementary Order 1 to PAO-11 which covers the Appalachian region, northeastern Oklahoma, eastern Kansas, and Missouri.

2. Automatic authorization is now granted for the use of materials for gas gathering lines and gas lift and booster plants when the cost of materials for any one complete operation does not exceed $10,000. Previously, it was necessary to file an application for an exception on all projects when the cost of the complete operation exceeded $5000.

3. Automatic authorization is granted for the use of materials for natural gasoline recovery, gas treating, cycling, and pressure maintenance when the cost of material for the one operation does not exceed $10,000. Previously, projects in excess of $5000 required the filing of a request for an exception.

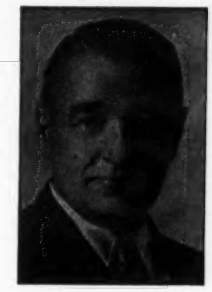
4. Previously, several clauses in PAO-11 made it possible for a natural gas or natural gasoline operator to use up to $500 worth of material for any purpose, even if the material originally had been obtained for maintenance and repair purposes. These clauses have been removed because these provisions are now included under WPB order P-98-b.

5. Restrictions on the installation or reinstallation of pumping or other artificial lifting equipment have been removed, except as specifically restricted by supplementary orders to PAO-11.

6. Restrictions have been removed to permit the reworking, redrilling, or deepening of any gas or oil well and recompletion of the well within the pool from which it last produced.

Restrictions on drilling of oil and gas wells in Arkansas, Louisiana, Mississippi, New Mexico and Texas were also released July 1.

Post-war NOTES and NOTIONS



By STANLEY JENKS

Jumping

My friend (the not too bright one) was discussing athletics at the school his teen-age boy is attending.

"I want Son to be a pole vaulter," he said. "Something that will be useful to him later."

"How?" I asked.

"Well! Suppose he's crossing a field and is suddenly charged by a mad bull and there is an eight-foot wall between him and safety. His ability as a pole vaulter would save his life."

"But he wouldn't have his vaulting pole with him at such a contingency."

"That's right! I never thought of that. Maybe he should go in for sprinting."

And thus another postwar dream was shattered.

Manufacturers' Help Essential

Our guest editor this month, B. A. Seiple, vice president in charge of sales, Jersey Central Power and Light Company, asks some mighty important questions that need prompt answers if we don't want to be scooped by Hitler's funeral. They are questions about fundamental sales policies, such as dealer cooperation, salesmen's training and compensation, the best way the home service department can perform, and to what goal our customer advertising should be directed.

The fact that such questions are asked by Mr. Seiple, who ranks among our top sales executives, is clear enough evidence that the previous answers were either not satisfactory or, more important still, he recognizes that the inevitably new conditions to be created following these years of wartime devastation in our economy call for a new deal in our sales policies too.

I am glad that Mr. Seiple has gone on record that "postwar planning needs to be carried on cooperatively with the appliance manufacturers." Personally, I think this is easily the most essential point in his editorial. Where would the gasoline lads have been without Ford and General Motors? Where would Montgomery be without his tanks or Nimitz without his carriers? Of course! If we want to go into this forthcoming "battle of the fuels" adequately armed, we need to be prepared with topnotch equipment, and the manufacturers who will be called upon to lay out the dough for the development work to deliver the goods are entitled to be assured that their product is going to be given maximum distribution and be free from so many of the pettifogging utility restrictions that were imposed previously. Every utility sales executive who will open his mind and make a genuine effort to see the picture from the manufacturer's viewpoint will have no difficulty in seeing what I have in mind.

In the last analysis, it is not a question of a few dollars' merchandising profit or whether a salesman makes his quota. The real problem is appraising the sales potentialities of a particular area and then formulating a sales policy that will blend the sales momentum of all manufacturers, dealers, and utilities to make damned good and sure that the job is done thoroughly.

The Chicago plan of F. X. Mettenet is an excellent example of this.

"Dream" Products

This page, unsuspectingly, has been in distinguished company, in its advocacy of a feet-on-the-ground approach to the postwar problem of maintaining and improving our gas industry.

Lawrence Valenstein, president of Grey Advertising Agency, New York, in a recent interview with Edward A. Morrow, of *The New York Times*, sees a definite threat to postwar recovery as a result of "too much dream product expectancy." Mr. Grey feels that a realistic consumer preparation program, sponsored by business in all its branches, is especially needed to do a thorough job of debunking before it is too late. I quote Mr. Valenstein from the *New York Times* interview.

> "Today," he says, "industry knows that it has put itself in hot water with its fantastic claims of extraordinary postwar product improvements. Here and there, some lone manufacturer has warned the trade against expecting postwar miracles. Here and there, some lone manufacturer has delicately suggested to the public that it might be more than a matter of months after the war before vastly improved models could be designed, tested, produced and distributed.
>
> "Unfortunately, powder puffs have been used to knock down the walls of public opinion—and naturally no noticeable effect has been achieved. Everybody and his uncle continue to expect immediate postwar miracles. If you ask consumers whether they will buy the first autos or refrigerators to come off the production lines, you find that in nine cases out of ten they intend to wait for the later models, if what they have does not need replacement.
>
> "This waiting for the later dream models presents a great threat to the re-establishment of our peacetime economy. If the nation's purchasing power is not converted into action, that is, buying, the postwar national income of over $100,000,000,000, which our leaders constantly refer to, also will be only a dream."

If any industry has a real stake in maintaining buying power, it is the gas industry, and in endorsing Mr. Valenstein's position on the evil that has been and is being done by the idiotic advertising of the *plastonic* school, I only hope that our own American Gas Association's national advertising committee has seen the light and will set the industry, and all other industries for that matter, a first-class example of realistic factual postwar promotional advertising. We have the aces, and we don't have to decorate them with cupids and clouds to win the pot.

Local Study

There is one thing I especially like about the job being done by the AGA Postwar Planning Committee. Its reports are commendable because they are essentially a proposed study pattern for every gas company.

There is no attempt made to particularize generalities. These facts, the committee says, were found in a certain company. They indicate such-and-such, and they suggest this-and-that. The committee makes no claim to cover the entire industry in its findings. Instead, it very sensibly challenges each operation to dig out its own facts upon which to base its own postwar program.

The committee knows only too well that local action must be undertaken.

Columbia to Meet Pennsylvania-New York Needs

THE Federal Power Commission on July 26 issued limited certificates to four subsidiaries in the Columbia Gas and Electric Corp.: The Manufacturers Light and Heat Co., Manufacturers Gas Co., United Fuel Gas Co. and The Home Gas Co., authorizing the construction, operation and acquisition of facilities to supply additional quantities of natural gas to the northern Pennsylvania and western New York area.

Part of the facilities to be installed by Columbia are to be used for supplying the requirements of United Natural Gas Co. by The Manufacturers Light and Heat Co. under a proposed contract calling for maximum daily deliveries of 10,000 Mcf.

The Columbia facilities authorized, which it is estimated will cost $1,927,092, will consist principally of construction of main line loops in Pennsylvania, relocation and installation of gas compressor units, dehydration plant additions and enlargements, and the acquisition by Home of approximately 10 miles of 6-in. transmission pipeline from Producers Gas Co., extending from a point north of Olean, New York, in an easterly direction parallel to Home's existing pipelines.

These facilities, which have been ordered completed not later than December 31, 1944, will have a capacity to deliver an additional 15,000 Mcf. of gas per day in the area proposed to be served.

The order and opinion (No. 114A) supplements No. 114 of April 26, 1944, issuing similarly limited certificates to Hope Natural Gas Co. and New York State Natural Gas Corp., subsidiaries of the Consolidated Natural Gas Co., authorizing the construction and operation of new facilities to supply additional quantities of natural gas in the same general area as the Columbia companies.

When completed, the Columbia project will furnish gas to many communities and war industries in Pennsylvania and New York which would otherwise have inadequate supply due to the decline in production from local natural gas fields. The necessary additional gas supply to be delivered to these areas by the Columbia facilities will be available upon completion of the pipeline of Tennessee Gas and Transmission Co. from the Gulf Coast Region of Texas to West Virginia.

Among the communities which will benefit from the Columbia project are Bradford, Oil City and Sharon, in Pennsylvania; Buffalo, Lackawanna, Olean, Binghamton, Endicott, Johnson City and Middletown, in New York. Improved services will also be provided to the important Beaver Valley area of western Pennsylvania, where many important war industries are located.

First Step Taken to End Turner Valley Wastage

THE first step to implement recent Alberta government legislation designed to end Turner Valley gas wastage and open the market to all Valley producers, has been taken by the Natural Gas Utilities Board.

British American Oil Co. will be required to handle all the gas in the south end of Turner Valley under a new board order. Further orders will be issued to Royalite Oil Co., and Gas and Oil Products to take care of gas from wells in other sections of the Valley.

The legislation passed by the recent session of the Alberta legislature is designed to return surplus gas to the underlying formation. The Natural Gas Utilities Board was appointed to implement the legislation, and it held recent public meetings in Calgary at which British American Oil, Royalite and Gas and Oil Products submitted plans.

The first order of the board directs the B-A company to install necessary equipment for gathering gas from all producing wells in the south of the Valley and return to the formation the portion of gas not required for the market.

Construction of the gas gathering lines, compressor station and repressure system was scheduled to get under way the end of June and the system may be ready for use in the fall. Equipment and construction is estimated at approximately $500,000.

The special gas committee of the Calgary City Council has been keeping in close touch with developments under the new legislation, bearing in mind the result may ultimately be an increase in the price of gas to city consumers.

Gasair and Eaton Metal Combine Facilities

Gasair Corp., San Francisco, and Eaton Metal Products Co., Denver, Omaha, Albuquerque and Billings, have combined certain of their liquefied petroleum gas manufacturing facilities, with operations to be carried on under the name "GASAIR, a division of Eaton Metal Products Co." Manufacture and sale of products will be handled in San Francisco as they have in the past, at 1072 Bryant Street, San Francisco 3, Calif.

PAW Authority Extended

PAW and WPB last month agreed on a plan giving greatly increased authority to PAW and providing that petroleum industry construction projects not exceeding $100,000 may be authorized by PAW. Previously this authority had extended only to projects not exceeding $25,000.

OWU Order Allows More Materials to Utilities

The Office of War Utilities, WPB on July 18 issued Direction 2 to Utilities Order U-1 under which utilities are authorized:

1. To use the abbreviated allotment number U-2 instead of specified quarterly allotments previously issued, except for allotments in excess of 100 tons of steel, 10,000 lb. of copper wire and cable, or 5000 lb. of aluminum wire and cable for individual jobs. Specific allotments for these three materials in excess of the quantities indicated remain in force.

2. To use and purchase larger quantities of materials and equipment than were authorized on approved applications if these will be of the same kind, type, size, and capacity as were approved, and if they are required for the job. This does not apply, however, to transformers, poles, crossarms and meters, the use and purchase of which are limited to quantities specifically authorized on the previous application.

Nothing in this direction makes it necessary for utilities to make any change in orders which they have already placed.

Gas Water Heater Approval Requirements Revised

The American Standard, Approval Requirements for Gas Water Heaters, has recently been revised by the American Standards Association to take advantage of the latest improvements in the safety, construction and performance features of gas water heaters. This standard is one of 35 appliance standards approved by the ASA under the technical leadership of the American Gas Association, and the cooperation of other interested groups.

The standard is written in four parts. It covers: construction requirements for all types of water heaters; and performance requirements for water heaters using natural and manufactured gas as a fuel, water heaters using liquefied petroleum gases, and water heaters using butane-air gas. The appendix contains a list of definitions and several drawings illustrating the arrangement of apparatus for tests.

The American Standard, Approval Requirements for Gas Water Heaters (Z21.10-1944) may be obtained for $1.00 per copy from the American Standards Association, 29 West 39th Street, New York 18, N. Y.

Cities Service Plans Move From Bartlesville

Plans for removal of the accounting and engineering divisions of the Cities Service Gas Co., from Bartlesville, Okla., to Oklahoma City, were announced July 25, by S. B. Irelan, president of the company.

Part of the operating personnel will be removed to Wichita, Kansas, with general executive offices maintained in both Oklahoma City and Wichita. The removal to Oklahoma City is scheduled for about November 1, while transfer to Wichita may require from six months to a year because of the housing situation in Wichita.

Cities Service Oil Co., headed by H. R. Straight, will remain in Bartlesville.

for dependable GAS HEATING

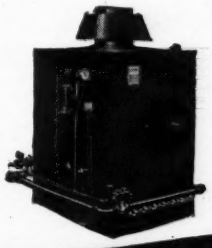
These products are engineered by gas heating specialists and embody every advanced feature for efficient, automatic and fuel-saving performance. A complete line (several items of which are shown here) meets every need of heating and hot water supply. Most models are available now for essential uses under WPB Limitation Orders; others must wait until Victory comes.

When you sell or recommend AMERICAN Gas-Fired Equipment you are sure of outstanding quality and dependability, backed by the best known name in heating. We invite inquiries regarding our products and their current availability.

GAS - FIRED
AMERICAN
HEATING EQUIPMENT

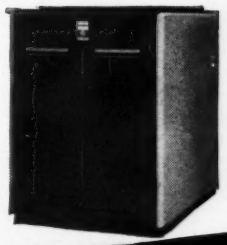
EMPIRE GAS BOILER

A masterpiece of engineering and design. Completely automatic. Handsome jacket encloses all controls. Range of A.G.A. ratings: Steam, 255 Sq. Ft. to 1600 Sq. Ft.; Water, 210 Sq. Ft. to 2560 Sq. Ft.



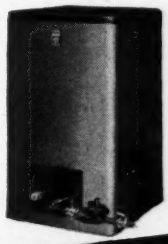
STANDARD GAS BOILER

Equally efficient as the Empire and available in larger sizes. Range of A.G.A. ratings: Steam, 610 to 16,000 Sq. Ft.; Water, 210 to 25,600 Sq. Ft.



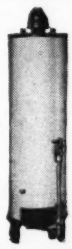
MOHAWK GAS FIRED WINTER AIR CONDITIONER

An attractive, quiet, completely automatic unit for winter air conditioning in small, medium or large homes. Nine sizes ranging from 60,000 to 300,000 A.G.A. Btu input per hour.



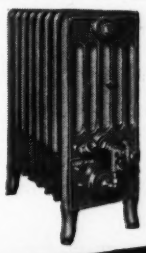
SHAWNEE GAS FIRED WARM AIR FURNACE

Fine appearance, durable steel construction, dependable controls and ribbon burners make the Shawnee outstanding for thrifty gas heating. Seven sizes with A.G.A. Btu input per hour from 65,000 to 140,000.



BUDGET GAS FIRED WATER HEATER

Provides ample hot water automatically at nominal cost. A white enamelled, insulated, steel jacket, with black trim, conserves heat and adds smart appearance. 3 sizes — 20, 30 and 40 gallons.

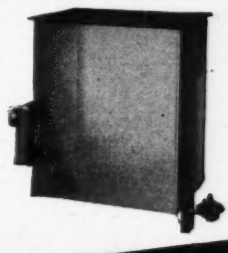


AMERICAN GAS FIRED STEAM RADIATOR

A complete heating unit that provides the comfort of radiator heating — automatically. Unvented type with special Thermal Control, and other good features which assure controlled operation and good economy.

AMERICAN GAS CONVERTER

Converts any round boiler or warm air furnace to gas burning. Available in a wide range of sizes. Has the exclusive Thermotor Throttling Control, which centers all control functions in one valve.



SAGINAW GAS FLOOR FURNACE

A low cost unit for small homes. Provides satisfactory heating results with minimum fuel — completely automatic if desired. Four sizes: 20,000, 35,000, 50,000 and 70,000 A.G.A. Btu input per hour.

AMERICAN RADIATOR & Standard Sanitary
New York **CORPORATION** *Pittsburgh*

ASSOCIATIONS

Manufactured Gas Dept. Holds Organization Meeting

THE Managing Committee of AGA's manufactured gas department met on June 6, for the first time since the Association's reorganization into departments, to plan the framework of an efficient, representative organization for the manufactured gas industry. George S. Hawley, president, the Bridgeport Gas Light Co., Bridgeport, Conn., and chairman of the department presided, and pointed out autonomous rights of various departments, subject to the jurisdiction of the executive board.

G. S. Hawley

A provision of importance in the new arrangement, Chairman Hawley indicated, is that the chairmen of the Natural Gas and Manufactured Gas Departments are members of the Association's Finance and Control Committee which passes upon all requests for funds and reviews the budget estimates of the Departments, Sections and Committees. Points brought out:

1. All activities of a jointly manufactured and natural gas nature will remain with the present Sections and Committees.

2. Purely manufactured gas committees, such as the Gas Production and Gas Conditioning Committee of the Technical Section, will hereafter function under the Manufactured Gas Department. However, at least for the time being, the Technical Section will proceed with the organization of these committees for the next Association year.

3. Due to the mutuality of interest and the need for a highly cooperative arrangement between the Manufactured Gas Department and the Technical Section, it was suggested that the chairman of the latter, when a manufactured gas man, should serve as a member of the Department's Managing Committee.

4. The Manufactured Gas Department is represented on the newly organized General Coordinating Committee on Research by D. S. Reynolds, vice president, Boston Consolidated Gas Co.

Chairman Hawley announced the appointment of a committee, composed of Vice-Chairman Boothby and Secretary A. Gordon King, to secure information regarding manufactured gas activities of Association Sections and Committees.

Particular attention centered on postwar technical studies now in progress and it was emphasized that these should be continued and accelerated.

A cardinal point in the new organization plan is to provide a method of keeping fully informed of research, particularly in regard to gas manufacturing methods, being conducted by such foreign organizations as the institution of Gas Engineers in London and its affiliated research groups. Edward J. Tucker, director and general manager, Consumers Gas Co. of Toronto, will study this problem.

New Committee Appointed To Coordinate Research Work

All research activities of the American Gas Association have been centralized under the coordinating committee on research, with E. P. Noppel, Ebasco Services, Inc., New York, as chairman. Organization meeting was held at French Lick Springs, Ind., on May 9 when the committee's scope was outlined by the executive board as follows:

E. P. Noppel

"This committee shall be requested to maintain a constant review of all Association research and from time to time make recommendations to the Executive Board for continuing, initiating, discontinuing, enlarging or reducing any and all research undertakings. It shall be especially the duty of this committee to make recommendations on the relative importance of research items to the Finance and Control Committee prior to preparation of the annual budget estimate. The Departments and Sections of the Association shall be requested to contribute to the work of this committee."

Conventions Cancelled

Defense Transportation Director J. M. Johnson has urgently requested that all conventions scheduled for the latter half of 1944 be cancelled in the interest of wartime transportation, even at the sacrifice of each organization's need for wartime conference and postwar planning.

Complying with this request, the American Petroleum Institute indefinitely deferred its 25th Annual meeting scheduled for Chicago in November. The 15th Anniversary Meeting of the Independent Petroleum Association of America, scheduled for Dallas, October 23-25, will be replaced by a board-of-directors meeting in Dallas, Oct. 9-11.

H. D. Hancock To Chairman Technical and Research Body

H. D. Hancock, president of Gas Advisers, Inc., New York, N. Y., has been appointed chairman of the technical and research committee of the natural gas department of the AGA, according to J. French Robinson, chairman of the department. Mr. Hancock succeeds H. C. Cooper.

H. D. Hancock

A member of the committee since its organization in 1920, Mr. Hancock has also been chairman of the Pipe Line Subcommittee since 1925, a member of the gas measurement subcommittee, and chairman of the AGA rate committee.

Other gas men serving on the committee include the following:

Burt R. Bay, Northern Natural Gas Co., Omaha; C. H. M. Burnham, Panhandle Eastern Pipe Line Co., Kansas City; C. U. Daniels, Oklahoma Natural Gas Co., Tulsa; Lester J. Eck, Minneapolis Gas Light Co., Minneapolis; D. P. Hartson, Equitable Gas Co., Pittsburgh; R. W. Hendee, Colorado-Interstate Gas Co., Colorado Springs; E. V. Kesinger, Natural Gas Pipeline Co. of America, Chicago; N. C. McGowen, United Gas Pipe Line Co., Shreveport; Wm. Moeller (Jr.), Southern California Gas Co., Los Angeles; J. French Robinson, The East Ohio Gas Co., Cleveland; E. F. Schmidt, Lone Star Gas Co., Dallas; Geo. S. Young, Columbia Engineering Corp., New York.

New Committee Heads Up AGA Promotion Program

A committee on gas industry promotional development has been appointed by the A. G. A. executive board to consider the best means of promoting the interests of the industry through utilization research, production research, promotion, advertising, to implement recommendations of the Postwar Planning Committee and to restore certain Association functions. A tentative plan of action was approved and a small committee authorized to work out details and methods of financing.

Personnel Group Holds D Day Conference

The Southwest Personnel group, sponsored by the American Gas Association, held its fifth meeting on June 6 in Shrevreport, under the chairmanship of M. V. Cousins, personnel director, United Gas Pipe Line Co.

Attention of the meeting centered on payroll allotment plans for the purchase of war bonds, re-hiring of returning servicemen, and postwar personnel planning, with a brief discussion of recent national labor trends, and WPB rulings. Kurwin R. Boyes, secretary, AGA, outlined the underlying purpose of the regional meetings and stated that the Natural Gas Distribution Job Classification Manual, prepared by the group, was being effectively used throughout the industry.

A valuable report on Employee Benefit Programs, based on a recent survey, was presented by Robert G. Kenan, Southern Natural Gas Co., Birmingham, Ala., chairman of the committee devoted to that subject.

Other topics reviewed at the meeting included: recent changes in Selective Service regulations, new developments in the unionization of employees, the awarding of service pins, value of suggestion systems, and application payroll allotment plans.

Three Meetings Scheduled By Mid-West Association

The Mid-West Gas Association will hold the second of a series of four sectional meetings at Omaha, Nebraska on September 12 at the Fontenelle Hotel under the direction of Joe E. Walsh, Metropolitan Utilities District, and Larry Shomaker, Northern Natural Gas Co.

A third meeting will be held in November in Minneapolis, and the fourth in February at Des Moines, Iowa.

At the annual meeting of the California Natural Gasoline Association, held in Los Angeles July 11, C. D. Gard, Union Oil Co., was elected president to succeed R. W. Heath. Signal Oil & Gas Co.

After working for the Los Angeles Bureau of Power & Light, Gard joined Union Oil Co., doing experimental work. He has also served the company as plant engineer, superintendent of gas operations and chief process engineer.

A CNGA mmber since 1926, Gard has served as technical committee chairman, a director, member of the executive committee, and as vice president.

Measurement Course Offers Practical Methods Booklets

It has been announced recently, in connection with the work of the Southwestern Gas Measurement Short Course, that certain publications of the findings of the committee for the study of practical methods are now available, and may be purchased for 10c by writing to W. H. Carson, Dean of College of Engineering, The University of Oklahoma, Norman, Okla.

These publications are: (1) Domestic Meter Testing; (2) Testing Large Capacity Positive Meters; (3) Orifice Meter Testing; (4) Chart Calculation; (5) Specific Gravity Determination (Test Procedure); (6) Meter and Regulator Station Design; (7) Recording Thermometers; (8) Effect of Barometric Pressure on Gas Measurement; (9) Useful Tables for the Gas Measurement Man., Part No. 1; (10) Useful Tables for the Gas Measurement Man., Part No. 2; (11) Safety Suggestions for Displacement Meter Testing.

AGA CHICAGO MEETING PLANNED; ROBINSON NOMINATED FOR PRESIDENT

The American Gas Association will hold its twenty-sixth annual meeting at the Stevens Hotel, Chicago, Thursday and Friday, October 5-6, and will limit discussions, in accordance with desires of the war agencies, to problems of winning the war and securing the peace.

Wednesday, October 4, will be given to committee meetings, luncheons and dinner meetings, Thursday morning and luncheon to the Technical, Residential Gas, Industrial & Commercial Gas and Accounting sections, and Thursday afternoon to Friday noon to General Sessions. Arrangements by the program committee are under the chairmanship of Robert G. Griswold, president, Electric Advisers, Inc.

At the meeting, the general nominating committee will present for consideration the following names:

For President—J. French Robinson, president, The East Ohio Gas Co., Cleveland, Ohio.

For First Vice President — E. J. Boothby, vice president and general manager, Washington Gas Light Co., Washington, D. C.

For Second Vice President—R. H. Margrove, vice president, United Gas Pipe Line Co., Shreveport, La.

For Treasurer—Edward F. Barrett president, Long Island Lighting Co., Mineola, N. Y.

For Directors—two-year terms:

R. G. Barnett, vice president and general manager, Portland Gas and Coke Co., Portland, Ore.

John W. Batten, president, Michigan Consolidated Gas Co., Detroit, Mich.

Arthur F. Bridge, vice president and general manager, Southern Counties Gas Co., Los Angeles Calif.

James A. Brown, vice president, The Commonwealth and Southern Corp., New York, N. Y.

D. W. Harris, vice president and general manager, Arkansas Natural Gas Corp., Shreveport, La.

Lyle C. Harvey, president, Bryant Heater Co., Cleveland, Ohio.

Norton McKean, president, American Meter Co., Albany, N. Y.

Hudson W. Reed, president, The Philadelphia Gas Works Co., Philadelphia, Pa.

Herman Russell, president, Rochester Gas and Electric Corp., Rochester, N. Y.

T. J. Strickler, vice president and general manager, Kansas City Gas Co., Kansas City, Mo.

P. S. Young, chairman, Executive Committee, Public Service Electric Gas Co., Newark, N. J.

Accounting Section: For Chairman—C. E. Packman, Middle West Service Co., Chicago, Ill. For vice chairman—E. F. Embree, New Haven Gas Co., New Haven, Conn.

Industrial and Commercial Gas Section: For Chairman— Harry K. Wrench, president, Minneapolis Gas Light Co., Minneapolis, Minn. For vice chairman—Harry A. Sutton, assistant general industrial fuel representative, Public Service Electric & Gas Co., Newark, N. J.

Manufacturers Section: For Chairman—Frank J. Hoenigmann. executive vice president, Cribben and Sexton Co., Chicago, Ill.

Publicity and Advertising Committee: For Chairman—C. A. Tattersall, Niagara Hudson Power Co., New York, N. Y.

Residential Gas Section: For Chairman—J. H. Warden, Oklahoma Natural Gas Corp.. Tulsa, Okla. For Vice Chairman—J. J. Quinn, Boston Consolidated Gas Co., Boston, Mass.

Technical Section: For Chairman—L. E. Knowlton, Providence Gas Co., Providence, R. I. For Vice Chairman—Lester J. Eck, Minneapolis Gas Light Co., Minneapolis, Minn.

1943 Proceedings Available

The 1943 American Gas Association Proceedings, containing the record of the twenty-fifth annual meeting of the Association, October 11-13 at St. Louis, has just been published. In addition to the addresses, papers and discussions presented at the meeting, the Proceedings include important committee and research project reports.

The Proceedings contains 436 pages, illustrated, indexed and clothbound. Copies may be obtained at $3.00 to members; $7.00 to non-members, by addressing American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Oklahoma Association Plans One Day Gas Meeting

A one-day conference of the Gas Division of the Oklahoma Utilities Association will be held in Oklahoma City, September 22, Miss Kate A. Niblack, secretary of the association announces.

L. A. Farmer, president, Northern Oklahoma Gas Co., Ponca City, Okla., chairman of the Gas Division, will preside at the meeting. Papers and discussion will be confined principally to war-time problems.

Collins Heads Florida Group

At its annual meeting, May 19-20, the Florida-Georgia Gas Meters Association elected to the presidency W. Bond Collins, Peoples Water and Gas Co., Miami Beach, Fla. B. G. Duncan, Florida Power Corp., Orlando, was named secretary.

Interstate Oil Compact Commission

Urges States to Make Natural Gas Study

EACH natural gas producing state, individually, or through some central organization, was urged to make a study of natural gas production, reserves and uses, in a report of the Regulatory practices Committee, T. A. Morgan, of Kansas, chairman, to the Summer meeting of the Interstate Oil Compact Commission at the Shirley-Savoy Hotel, Denver, Colo., June 30-July 1.

The report called attention to the utilization of natural gas and synthesis processes and construction of large plants for such purposes. The fact that demand for natural gas for domestic and industrial fuel has increased and there have been extensive construction projects for new pipe lines, coupled with claims that the reserves of natural gas are, "surprisingly limited," makes it imperative that a study of the situation should be made, the committee declared. The study should attempt to determine "what reasonably may be expected in the future, what will be the effect of increased transmission of gas beyond the areas in which it is produced and what standards, if any, should be properly and legally set up concerning functional uses of the product."

The mineral leasing policies of the federal government on the Public Domain were sharply criticized by some of the speakers and one of the committees. Hiram M. Dow, of New Mexico, representing the governor of that state, declared that the federal government is gradually but surely edging its way into the oil business through its policy in handling its mineral rights on the Public Domain and its recently acquired lands. Asserting that it is "high time that something should be done," he stated that lands have been acquired at a rapid rate by 27 different government agencies to the extent of 383½ million acres (1/5 the total area of the United States).

The speaker declared that the oil and gas industry, because of this control of mineral rights, is facing many problems which cannot be solved until Congress completely re-writes the mineral leasing act. He particularly criticized rules published by the secretary of agriculture May 13, 1944, fixing the conditions under which leases shall be made. "This shows that the secretary of agriculture has adopted a device and method, not of disposition of federal minerals, oil and gas, but for government ownership and operation of them."

Development of public lands should be left to states and not to government agencies, Governor J. C. Vivian, of Colorado, told the Commission. "If federal regulations governing the oil industry were relaxed our people could prospect for oil. There is plenty of it in the West."

Warwick M. Downing, of Colorado, chairman of the Public Lands Committee, declared that practically all oil and gas fields were discovered by wildcatters who took great risk in money and life and "who now have been almost stopped by royalty scales fixed in Washington. If the department of the interior had pursued a more liberal policy there wouldn't be this gas famine."

The Commission adopted a report of the Public Lands Committee of the IOCC which expressed opposition to further acquisition of land by the federal government. Regulations of the agricultural department relating to leasing of lands were sharply criticized. In some of these is found the, "beginning of a new system of public lands and a public land policy extending to every state, administered by a bureaucracy in Washington. Nothing can be more pernicious than for our national government to become a proprietor in business property which is entirely foreign to our principles of government," the report concluded.

Senator Carl A. Hatch, of New Mexico, chairman of the U. S. Senate Committee on Public Lands, stated that there should be no conflict between the federal government and the states over oil development on public lands. He declared that their interests are identical but there should be a complete revision of the federal laws pertaining to such development, to avoid conflict and confusion.

Leaders of the Interstate Oil Compact Commission applauded a decision of the Petroleum Administration for War, announced during the closing session, which relaxes federal drilling restrictions and allows drilling of gas wells anywhere in the country, without special permits, if the well is the only one in 640 contiguous acres.

A most startling success in the development of oil and gas in the Rocky Mountain regions, was predicted by Thomas S. Harrison, a consulting petroleum geologist, of Denver. He said that a large number of strong companies have come to the area bent on development of new reserves.

Some 107 oil and gas fields have been developed in Wyoming, Pierre LaFleiche, state mineral supervisor of that state, told the Compact meeting. Wyoming produces nearly every grade of oil, a great impetus to wildcatting and production has been given by increased demands of the war. He said that up to January 1, 1944, about 597 million barrels of oil and 1 trillion cu. ft. of natural gas had been produced from 3338 oil wells and 131 gas wells.

J. F. Gallis, representing L. L. Jordan of Arkansas, made a preliminary report of a sub-committee of the Research and Coordinating Committee on determination of bottom hole pressures and gas-oil ratios, as applying to conservation work. He stated that a final report will be made at the Fall meeting of the IOCC.

Three members of the Federal Power Commission attended the Denver meeting — Claude Draper, John Scott and Nelson E. Smith. Four governors also were in attendance, Governor Andrew F. Shoeppel, of Kansas, chairman of the Commission; Governor Robert S. Kerr of Oklahoma; Governor J. C. Vivian, of Colorado, and Governor Lester C. Hunt, of Wyoming. Other prominent visitors included Dean Gillespie of Denver, J. Edgar Chenoweth, of Trinidad, and A. M. Fernandez, of New Mexico, all members of Congress, and J. French Robinson, Cleveland, Ohio, vice president, AGA.

Independent Gas Group Opens Oklahoma City Office

The Independent Natural Gas Association of America opened a regional office in the First National Bank Building, Oklahoma City, Okla., July 20, with Charles L. Orr as secretary. For the past five years Mr. Orr has been secretary of the Interstate Oil Compact Commission but resigned at the meeting of that organization, July 1, to take his present position.

The executive committee of the Independent Natural Gas Association will meet in Tulsa, Okla., August 1, to outline a program of activities. Officers of the association include: E. Buddrus, Chicago, president, Panhandle Eastern Pipe Line Co., president; Paul Kayser, president, El Paso Natural Gas Co., El Paso, Texas, first vice president; J. H. Dunn, vice president, Shamrock Oil and Gas Co., Amarillo, Texas, second vice president, and F. W. Peters, secretary-treasurer, Oklahoma Natural Gas Co., Tulsa, Okla., Treasurer.

PCGA Plans Two-Day Business Meeting

THEME of the Pacific Coast Gas Association's 51st Annual meeting will be "The Gas Business." Respecting ODT travel restrictions the meeting will be confined to two days, September 13 and 14, at the Ambassador Hotel in Los Angeles. Frank C. Packer, Payne Furnace and Supply Co., is chairman of the arrangements committee.

F. C. Packer

First day general session speakers will be PCGA President E.L. Payne and AGAEM President W. F. Rockwell. The afternoon session will be devoted to domestic gas research and will be led by a representative from the Cleveland laboratory, probably Assistant Director W. R. Teller.

Delegates to the meeting will include H. Vinton Potter, coordinator of AGA's coordinated gas kitchen program; George H. Smith, newly appointed director of AGA's Natural Gas Department; Jessie McQueen, home service director of the American Gas Association.

The September 14 general session will feature addresses on training methods, postwar planning, gas industry research. Speakers will include W. R. Davis, personnel manager, Southern California Gas Co.; H. L. Masser, chairman of committee for Gas Industry Development; John F. Yellott, director, Institute of Gas Technology; L. M. Klauber, vice president and general manager, San Diego Gas and Electric Co., and Wm. C. McDonald, deputy director, Plumbing and Heating Division, WPB.

Leroy M. Edwards, vice president and general manager, Pacific Lighting Corp. will be the luncheon speaker. In the afternoon parallel sessions of the accounting, sales and advertising, technical, and home service groups will be held.

The annual meeting of the Manufacturers Section to be held at 10:00 a.m. on September 13 will include election of officers, addresses by Chairman A. H. Sutton and Leonard Macomber, Washington Representative of AGAEM., talks on utility-manufacturer-dealer cooperative policies by W. M. Jacobs, Southern California Gas Co., and O. R. Doerr, Pacific Gas and Electric Co.

Speakers at the Women's Committee meeting will be Hazel Hurst, Hurst Foundation for the Blind, Monrovia and Ben L. Wells, of Galbraith and Wells, who will talk on "Women in Public Relations."

Out of town delegates are asked to notify Clyde H. Potter, Southern Counties Gas Co. as to their hotel requirements by August 15.

PACIFIC COAST GAS ASSOCIATION NOMINATIONS

For President—O. R. Doerr, general sales manager, Pacific Gas and Electric Co.

For Vice President—H. W. Edmund, vice president and general manager, Coast Counties Gas and Electric Co.

For Treasurer—D. G. Martin, general auditor, Pacific Gas and Electric Co.

For Directors (Two Year Term): F. M. Banks, vice president, Southern California Gas Co.; R. G. Barnett, vice president and general manager, Portland Gas and Coke Co.; N. Henry Gellert, president, Seattle Gas Co.; E. T. Howard, sales manager, General Controls.

Manufacturers Section

For General Chairman—E. T. Howard, General Controls.

For General Vice Chairman—Henry Honer, Western Stove Co.

Accessories Division: For Chairman—J. E. O'Hagen, Grayson Heat Control, Ltd.; For Vice Chairman—M. M. Kennedy, Domestic Thermostat Co.

Heating Division: For Chairman—C. A. Gabriel, Monarch Heating Co.; For Vice Chairman—Eric Slater, Ideal Heating Corp.

Range Division: For Chairman—Harry W. Jackson, Jas. Graham Mfg. Co.; For Vice Chairman—H. F. Larkin, O'Keefe & Merritt.

Water Heater Division: For Chairman—R. W. Tarleton, Southern Heater Co.; For Vice Chairman—Dick Hinckley (at present in U. S. Navy).

Alternates to the General Chairman and Vice Chairman on the Board of Directors of AGAEM—F. C. Packer, Payne Furnace and Supply Co.; E. S. Hoyt, Jr., Hoyt Heater Co.

CALENDAR

September

Mid-West Gas Asoociation, 2nd of four one-day sectional meetings—Omaha, Neb.

Pacific Coast Gas Association, Annual Meeting—Ambassador Hotel, Los Angeles, September 13-14.

Gas Division of Oklahoma Utilities Association—Oklahoma City, September 22.

October

National Safety Congress—Sherman, Morrison and La Salle Hotels, Chicago, Ill., October 3-5.

American Gas Association—Stevens Hotel, Chicago, Ill., October 5-6.

November

Mid-West Gas Association, 3rd of four one-day sectional meetings—Minneapolis, Minn.

Natural Gas Sub-Committees

The following sub-committees of the Technical and Research Committee are now being organized by AGA's Natural Gas Department: Gas Measurement Sub-Committee, Gas Well Deliveries Sub-Committee, Pipeline Sub-Committee and Sub-Committee on Code for Testing Natural Gas for Gasoline Content. Personnel of the sub-committees will be announced in the near future.

A number of natural gas department committees have already been appoint- These committees, with their chairmen, include the following: Managing—J. French Robinson; Advisory—R. E. Wertz; Technical and Research—H. D. Hancock; Time and Place—R. H. Hargrove; Nominating—R. E. Wertz; Committee on Supplymen's Fund—E. F. Schmidt; Transmission—E. V. Kesinger; Large Volume Sales—J. H. Gumz; Production and Storage—E. L. Rawlins; Accounting—Leith V. Watkins.

Synthetic Rubber Subject To Feature SCMA Meeting

The next regular monthly meeting of the **Southern California Meter Association** will be held at the Rio Hondo Country Club, Downey, on August 17, at which time a paper entitled "Appreciation of Measurement and Control in the Manufacture of Synthetic Rubber" will be presented by H. R. Erwin assistant technical superintendent of Goodyear Synthetic Rubber Corp. This subject should be of interest as a specific example of the application of instruments for measurement and control of all types of fluids. The program will be supplemented by a sound picture on synthetic rubber.

At its July 20th meeting, J. T. Cortelyou, Southern California Gas Co., and past president of the Association, presented "Publication No. 17," a review of the Association's meter course, which covered the fundamentals of measurement and summarized all papers given during the year.

W. C. McDonald, WPB Deputy To Address L. A. Meetings

William C. McDonald, deputy director of WPB, will be the principal speaker at a dinner to be given at the Biltmore Bowl on September 11 under joint sponsorship of the plumbing and heating industries of southern California and the Los Angeles chamber of commerce. McDonald will also appear on one of the sessions of the Pacific Coast Gas Association conference to be held at the Ambassador Hotel in Los Angeles, September 13 and 14.

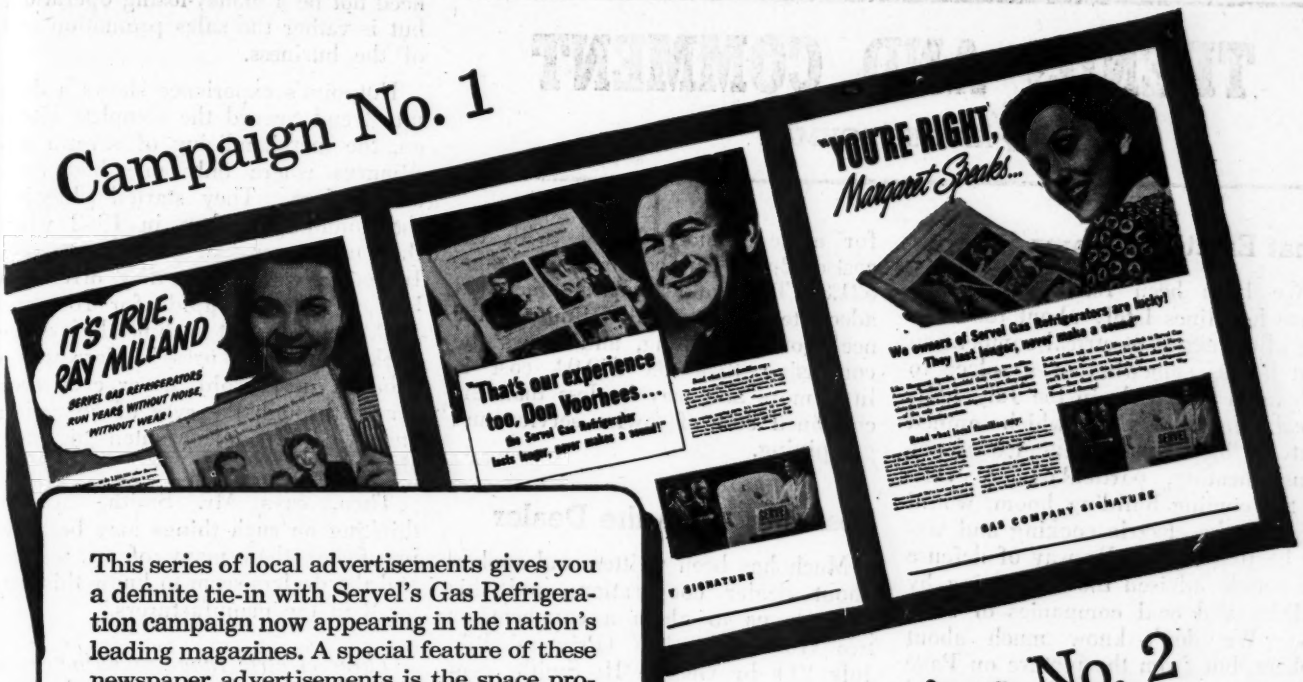
Musick Named President of Rocky Mountain Ass'n

At a meeting of the Rocky Mountain Gas Association, held at Denver, July 6, the following temporary officers were elected: G. M. Musick, architect, president; Samuel E. Fox, Fox & Co., vice president; D. A. Bell, Bell Plumbing & Heating Co., vice president; Roy G. Munroe, Public Service Co. of Colorado, secretary-treasurer.

2 SUGGESTED NEWSPAPER CAMPAIGNS

to help you build post-war Gas Refrigeration Sales

Campaign No. 1


IT'S TRUE, RAY MILLAND
SERVEL GAS REFRIGERATORS RUN YEARS WITHOUT NOISE, WITHOUT WEAR!
"That's our experience too, Don Voorhees... the Servel Gas Refrigerator lasts longer, never makes a sound!"
"YOU'RE RIGHT, Margaret Speaks..."
We owners of Servel Gas Refrigerators are lucky! They last longer, never make a sound!"
GAS COMPANY SIGNATURE

This series of local advertisements gives you a definite tie-in with Servel's Gas Refrigeration campaign now appearing in the nation's leading magazines. A special feature of these newspaper advertisements is the space provided for you to insert statements of your own customers. Experience has shown that enthusiastic Servel owners are generally willing to let you quote them.

Campaign No. 2

"As silent as the day we bought it!" says local housewife
"Servel Gas Refrigerator lasts for years..."
GAS COMPANY SIGNATURE
"LUCKY WE PICKED A SERVEL, IT NEVER NEEDS FIXING!" says local housewife
SERVEL
"No Noise! No Wear!"
You bet we like our Servel Gas Refrigerator"

These advertisements put an even stronger stress on local customer statements. They are bound to get good readership, because most people like to read about their own townspeople—even if they do not know them personally. All you have to do is replace the small stock pictures with pictures of your customers . . . and replace the sample statements with those of your customers.

AVAILABLE IN THREE SIZES. The advertisements in both of these suggested newspaper campaigns are available in mat form in the following sizes: 6 columns by 16 inches; 5 columns by 13½ inches; and 4 columns by 11 inches.

Send for these mats today. You'll find them an effective way to promote Gas Refrigeration—dramatize Gas and Gas Service in your community. Write, too, for Servel's new booklet, "Getting Ready for the Post-War Market with Gas Refrigeration Now," if you have not already received your copy. Address Servel, Inc., Advertising and Sales Promotion Department, Evansville 20, Indiana.

Servel, Inc.
Evansville 20 Indiana

TRENDS AND COMMENT

By ARTHUR ROHMAN

That Electrical Competition

We have been reading so many scare headlines lately about the coming blitzkreig of electrical competition that it was somewhat of a solace to run upon an article in the July *Electrical Merchandising*, which opined that the increasing acceptance of gas house heating, particularly in view of the coming building boom, would threaten the electric cooking and water heating loads. By way of defense the article advised the advertising by utilities and coal companies of stokers. We don't know much about stokers, but from the picture on Page 40, we are not much inclined to goad ourselves into looking into the subject.

Wiring Ahead

The chart showing the closing gap between gas and electric range sales is reprinted from the booklet, "Wire Ahead for Better Living," published by the Electric Range Section of the National Electrical Manufacturers Association. Tomorrow's home, says the booklet, will demand adequate wiring, for the electric conveniences in a modern home may represent a load of as much as 15,000 watts. The two-wire service in today's average home is not designed to carry more than on fourth of this load.

The booklet goes into costs, comparing that of adequate 3-wire service for a new home, $39.04, with the cost of 2-wire service for a new home, $21.84. The booklet then assumes that adequate wiring would eliminate the need for gas piping, and draws the conclusion that the $39.04 cost is little more and may be less than the combined cost of 2-wire service and gas piping.

Learning From the Dealer

Much has been written and spoken about dealer cooperation, and this prompts us to glean a comment or two from an article (Printers' Ink, July 21) by George H. Smith, general sales manager, Edison General Electric Appliance Co., relative to that company's home-study course on basic merchandising. It seems that during the past 9 months 16,000 dealers were given the course, but that Hotpoint got a good deal of the education.

Durable consumer goods dealers (80% have survived the war), the article states, are going to be far better than in prewar days, because they have become service men and service-minded: they are learning what makes appliances tick, and they have become friends and helpers to their customers, not just salesmen.

The dealer looks to the future with a new concept of merchandising, a better understanding of the customer's attitude, the realization that service need not be a money-losing operation, but is rather the sales promotion end of the business.

Hotpoint's experience shows a definite trend toward the complete kitchen, the merchandising of several appliances where only one had been sold before. They started plugging the complete kitchen in 1942 when they no longer had products to sell. In one advertisement they offered a kitchen planning guide for 10c, and 50,000 people sent in dimes before the book was off the press! Here was a product, never sold, never even seen except through the eyes of an artist; and 50,000 people wanted to know about it.

Then, says Mr. Smith, "Public thinking on such things may be moving faster than many of us realize, and the dealers seem to know this better than the manufacturers."

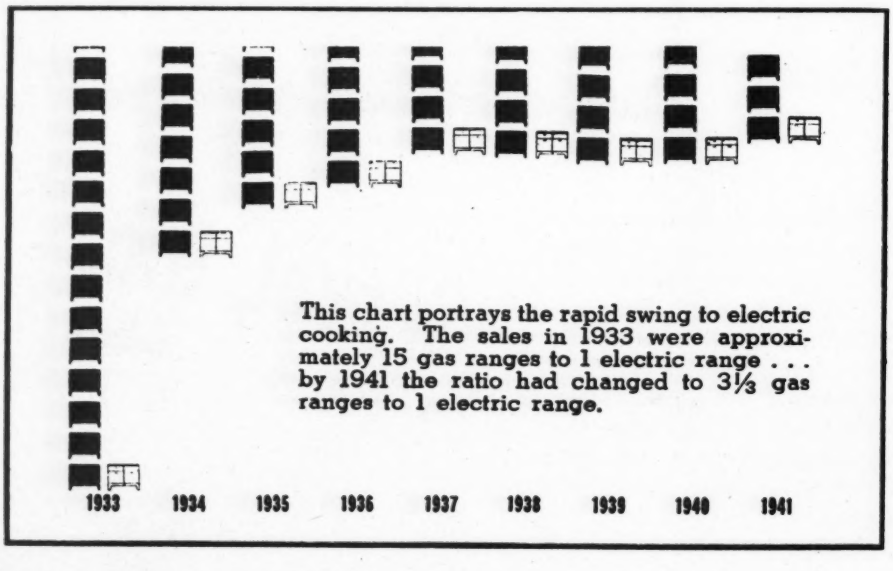
Three electric range manufacturers, A. D. Stoves, Inc., Frigidaire Division of General Motors, and Malleable Iron Range Co. have been authorized by WPB to produce 12,782 *electric ranges in the third quarter of* 1944 *as a portion of* 88,000 *electric range quota set by WPB for* 1944.

Tax Dilemma

When the City of Detroit got the idea that it had the right to drain off the "excess profits" taxes paid by Detroit Edison through imposition of a 20% municipal tax on gross income, it started state regulatory bodies throughout the country sniping at utility rate structures. (G A S, Feb., 1944, p. 48).

With the Detroit case still undecided (the Michigan Supreme Court has ordered the Public Service Commission to proceed with an investigation), the battle front has extended to California where the State Railroad Commission has leveled its guns at 130 public service corporations. Hearings will be held in August to determine whether the commission should refuse to allow these corporations to deduct federal war taxes as operating expenses in establishing rates. Federal war taxes means "excess profits" and other federal income taxes in excess of highest rates prevailing in 1936-1939, inclusive.

Effect of the California action would be to throw $100,000,000 out of the federal treasury into the pockets of consumers. Treasury Secretary Morgenthau, respecting states rights, has stated that the federal government would not oppose rate reductions based on excess profits taxes.



This chart portrays the rapid swing to electric cooking. The sales in 1933 were approximately 15 gas ranges to 1 electric range . . . by 1941 the ratio had changed to 3⅓ gas ranges to 1 electric range.

An Example of P·G and E's current GAS advertising appearing in 309 northern and central California newspapers

OUR THEME THIS MONTH

*Conservation of Gas & Care of Equipment

"RUST CRUST"
DESTROYER OF
WATER HEATERS

GE35W-844

Rust crust starts down low at the bottom of water heater tanks. Rust crust begins as a few pin-hole rust spots and then spreads into a crust of rust inside tank. The water conditions in your locality determine how rapidly rust crust develops and how soon your water heater tanks rust through and begin to leak. *There is one precaution to take...flush your water heater tank at frequent intervals.* This is simple and easy to do. Attach a hose to the faucet drain on your water heater and run off water into a bucket until water runs clear. *Do not* turn off the gas, electricity or water supply as full pressure is needed to clear tank of sediment. Do this every ninety days and rust crust formation and tank failure can be retarded.

PACIFIC GAS AND ELECTRIC COMPANY

While some small benefit would accrue to individual consumers, it would appear that the adoption of this policy in California would be vastly detrimental to the war effort because it would:

1. Set a precedent for circumvention of the federal war tax program.
2. Stimulate inflation by placing more money in general circulation.
3. Encourage excessive use of gas, electricity, and transportation facilities when conservation is most needed.
4. Place an unnecessary strain on restricted utility personnel whose primary task is to do a war job.

It would appear that injustice would be done some utilities since a policy to eliminate "excess profits" taxes could not be applied flatly: some could take it; some could not. Furthermore, the term "excess profits," a misnomer, has a sour ring in the public ear, and many a heavily taxed utility with less present net income than it had before the war will, through the notoriety given these hearings, be up for public crucifixion.

While loss of revenue and of the post-war credit would be regrettable, utility executives are probably more concerned with the possible need for future upward revision of rates, always a difficult procedure, when lower revenues and higher operating costs squeeze more than the "excess" out of profit.

The effects of this action are too far reaching to permit of "expert" conclusion or even of full exposition. All we are is a consumer of gas and electric services. And we look at the matter in that light. Yes, we want the commission to keep an eye on the utilities. But we're dead against over complicating an already too complicated world. We have no complaints. Hot or cold, rain or shine, we have had our gas and our electricity, and the cost has been no more and possibly less than it was prewar. Which is more than we can say for the price of eggs. But what's more to the point, we've got some good friends "over there" with a helluva lot more to worry about than a gas bill. We say let the government keep its 100,000,000 bucks and let's get on with the war.

The office of War Utilities priority order U1 is currently undergoing revision to eliminate paper work. It has been proposed that blanket approval be granted gas, electric, water, and steam heating service extensions up to a probable limit of 1000 ft.

Glass and Gas

Libby-Owens-Ford Glass Co., after 14 years of research and testing, announces Thermopane, a new multiple, transparent insulating window glass. Thermopane, which, it is claimed, will reduce heat losses in an average home by as much as 50%, consists of two panes of glass, separated by a dehydrated air space hermetically sealed in by a special metal-to-glass bond around the edges of the glass.

Tests conducted in a cold cabinet by Dr. George B. Watkins, Libby-Owens-Ford research director, revealed a 20° difference in temperature between the warm and cold side of Thermopane, while the difference on a single pane was but 1°. The product has already been widely used by the armed forces—protecting delicate instruments in signal corps trucks, guarding airfield traffic control towers against arctic cold and tropic heat, serving in tank observation windows, and enclosing bridges of ships.

We find also, thanks to another glass company, Owens-Illinois of Toledo, that we are living in the age of the square milk bottle. "Handi-squares," as they are called, enable the housewife to store from 20 to 50% more milk in the same refrigerator space. Sanitary Farm Dairies, Cedar Rapids, Iowa, were first to use the square bottles.

Name Tomorrow's Kitchen. AGA Offers War Bond Prizes.

A contest to find a name for the glamorous new gas kitchens of tomorrow, open to all employees of gas utilities in the United States and Canada, has been announced by John H. Warden, chairman of the AGA Committee sponsoring the Kitchen Planning Program. Prizes are in war bonds, including a grand prize of a $500 war bond; two $100 war bond honorable mention prizes; nine $100 war bond district awards; two $100 war bonds to be offered contestant-at-large.

A broadside announcing the contest, just released, shows some of the interesting sketches of kitchen interiors now coming off designers' drawing boards. To encourage nationwide participation, the country has been divided into eight geographical divisions with Canada set up as a ninth region. To the winner in each district will be awarded a $100 bond. In addition, two 100 bonds will be given as prizes-at-large. From the 11 names or slogans originally selected, a national winner will be chosen and an additional award of a $500 bond given and the two runners-up will each receive an additional $100 bond.

The contest began August 1 and entries are to be submitted on a letter-size sheet of paper with the name or slogan, contestant's name and company affiliation. These must be mailed to the American Gas Association, 420 Lexington Avenue, New York 17, N. Y., not later than midnight of August 31. All names become the property of the American Gas Association and the decision of the judges shall be final.

The Coordinated Kitchen Program was started as a result of a report submitted by the Postwar Planning Committee whose Chairman is A. M. Beebee of Rochester Gas and Electric Corp.

AWARDS

• A third additional gold star has been awarded by the United States Maritime Commission to **Homestead Valve Manufacturing Co.** for their Maritime "M" Pennant. Of the 23 manufacturers who have been awarded their third gold star, Homestead Valve Manufacturing Co. is one of four which increased their production 20% or more during the past six months, as compared to the previous six months period.

• The Army-Navy "E" award for excellence in production of war materials was presented to the **Harper-Wyman Co.** of Chicago, July 13, when Army-Navy "E" pins were also given to employees. Philip S. Harper, president of the company, received the award.

The Harper valve and burner, developed in 1927, was a new idea for top burner cooking, each burner being two burners in one—a large burner for quickly heating the contents of a vessel to the boiling point, and a small inner burner that could be used independently to keep the food boiling. Although the Harper Burner system is the principal product of the company, a variety of valves, burners, automatic lighters, and stove fittings for domestic and commercial gas ranges are produced in peace time.

Connelly
IRON SPONGE

HIGH IN EFFICIENCY
LOW IN COST

Wherever applied, Connelly Iron Sponge has proven its high capacity and low cost beyond a shadow of a doubt. And, at the same time, it has demonstrated its remarkable revivifying properties.

For over 68 years this has been true. Connelly has been supplying the gas industry with the kind of gas purification material it *needs*.

Or, if you have a gas purification problem, Connelly is at your service . . . to help—with no obligation on your part.

CONNELLY IRON SPONGE & GOVERNOR CO.
Elizabeth, N. J. Los Angeles, Calif.
3154 S. California Ave., Chicago 8, Ill.

RADIANT type BURNER

Webster Series I Radiant Low Pressure Gas Burner.

This new burner has been installed and thoroughly field tested for satisfactory performance in the following types of boilers:

- **SCOTCH MARINE**
- **STEEL FIREBOX**
- **WATER TUBE**
- **H. R. T.**

These exhaustive tests in the laboratory and field have proved that **low pressure** gas can be utilized in these boilers to obtain **high ratings** and provide **vibrationless** operation. **Write for Bulletin No. 1, describing the Series 1 Radiant Low Pressure Gas Burner.**

Represented by:
FEDERAL SUPPLY CO. . . . Oklahoma City, Okla.
CATLETT ENGINEERS . . . . . Dallas, Texas
F. J. EVANS ENGINEERING CO., Birmingham, Ala.
F. P. FISCHER ENGINEERING CO., New Orleans, La.
F. J. EVANS ENGINEERING CO. . . Houston, Texas
E. G. LANGHAMMER CO. . . San Antonio, Texas
CLOWE and COWAN . . . . . Amarillo, Texas

Webster engineers are quickly available, to recommend the proper type of burner for the job. Satisfactory performance is guaranteed from each installation of Webster Burners and Control Equipment.

Consult WEBSTER First

THE WEBSTER ENGINEERING COMPANY....TULSA, OKLA.

Division of SURFACE COMBUSTION - Toledo, Ohio

P.C.G.A. PUBLICIZES A.G.A. LABORATORY

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS · AMERICAN GAS ASSOCIATION · APPROVED ·

Visit the American Gas Association Testing Laboratory in Los Angeles, and see how a great industry regulates itself. ★ So urges a recent P.C.G.A. advertisement in *Building Standards Monthly,* official organ of Pacific Coast building inspectors. ★ The inspectors are also reminded that: "The A.G.A. Seal of Approval is your assurance of safety and performance standards exceeding building code requirements." ★ Thus, and in other ways, the gas industry of the West staunchly supports the national testing-and-approval program, and reminds regional inspectors of its significance in relation to the Uniform Building Code.

THE PACIFIC COAST GAS ASSOCIATION

UNIFORM BUILDING CODE

GAS FUEL

SERVING THE WEST IN WAR AND PEACE

NEW PRODUCTS

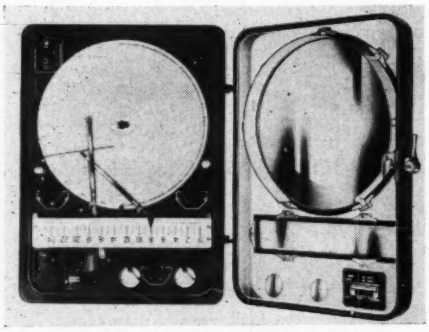
Potentiometer

The Bristol C., Waterbury 91 Connecticut.

Model: Pyromaster Self-Balancing Potentiometer, Model 431.

Application: To provide a self-balancing round-chart recording potentiometer that has no continuously moving mechanical elements, is unaffected by vibration, and needs no lubrication.

Description: The new Model 431 instrument has a universal wall of flush mounting case considerably deeper than that of the previous Model 440M, and has an internal hinged panel on which are mounted pen and indicator drive mechanism, and, in the case of electric controllers, the control contacts or proportioning slide wire, or in the case of air control, the complete new convertible-type air operated control mechanism.



This new deep case and inner panel make it possible to service or replace any part or portion of the instrument without disturbing any other part. It also makes it possible, in the case of electric type controllers, to include the control relays in the instrument thus eliminating considerable external wiring.

A heavy-duty pen-drive motor gives more torque for operating control contacts and other similar functions, especially under conditions of poor line voltage regulation.

The indicating scale on the indicating-recording model has been changed to a horizontal wide band instead of the rectangular dial-type provided on the Model 440M.

The stepping relays and the slide wire in the potentiometer circuit have been enclosed in a dust-proof bakelite housing, and a heavier power supply has been provided.

Another change is that a standard cell type of manual standardizing circuit now replaces the voltmeter type originally supplied.

Bulletin P1200, available from the Bristol Co., describes the new Model 431 Pyromaster in detail.

Line Blinds

Hamer Oil Tool Co., 2919 Gardenia Avenue, Long Beach 7, Calif.

Models: BW30, All-steel, Bolted Type Line Blind. L150, All-Steel Union-Type Blind.

Application: Designed for pipeline applications, these blinds can be operated by one man to effect a positive and permanent shut-off, or to open the line, in about one minute.

Description: The bolted type blind, Model EW30, is available in sizes from 2½-in. to 12-in., of all-steel construction, and all flange nuts as well as the stud for spreading the flanges apart when changing the plate or spectacle are designed for turning with a straight bar. The plate or spectacle may be had with squeeze-type or pressure-seal packing retained in an annular groove in the plate, or it may be smooth for use with flat gaskets. Ends are threaded or beveled for welding, as preferred by the user.

The union type blind, Model L150, is also made of steel, and is available in sizes ¾-in. and larger. It consists of two subs, which may be screwed or welded in the line, and a bar operated nut slotted to receive the plate and flat gaskets. When the nut is turned to the left the faces of the subs are spread enough to release the plate. Turning the nut to the right draws the subs together so that the plate is tightly clamped between them and a positive seal is effected.

Multi-Size Flaring Tool

Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago (7).

Model: No. 93-FB Multi-Size Flaring Tool.

Application: For making correct double flares on all popular sizes of thin wall steel tubing from 3/16-in. to ½-in. for SAE flare and inverted flare joints. Can also be used for making single or double flares on copper or aluminum tubing.

Description: Tool is small and convenient to work with. No vise and no hammering are necessary, and flaring can be done in very close quarters. Tool first bells tubing, using an adapter, then completes double flare in much the same manner as conventional flaring tool. Can be used with soft steel tubing of seamless, butt-welded or lap-seam-welded construction having not over .035-in. wall.

Welding Fluid

Midland Paint & Varnish Co., Cleveland, Ohio.

Model: "No-Spat" Welding Fluid.

Application: To reduce fumes, especially those created by welding of galvanized iron or zinc-coated sheets.

Description: Tests with this product showed the following results: After the laboratory apparatus was set up duplicated pieces of galvanized iron were tested. One series was treated with "No-Spat" welding fluid while the others were untreated. A competent welder, using an oxyacetylene torch, did the actual welding work.

As a fair comparison, each weld was stop-watched to two minutes and the torch removed, after which the accumulator pump was allowed to operate an additional two minutes to accumulate all the fumes and vapors. Reduction to fumes and smoke was claimed to be noticeable to the eye on "No-Spat" treated work.

Comparison of the vaporization showed that on untreated galvanized iron each two-minute weld vaporized 0.107 grams of zinc, while on galvanized iron treated with welding fluid only 0.074 grams of zinc were obtained through analysis and assay. Conclusion of this test would seem to indicate that welding fumes and vaporization of zinc can be materially reduced at least 30% by the application of a chemical solution like that which was tested.

Catalogs

• **Dresser Manufacturing Co.,** Bradford, Pa., has published a four-page brochure, serving to re-introduce their Style 85 Bellmaster Joint for cast iron pipe, once again available after manufacture was curtailed by WPB. Sizes available are 3 in., 4 in., 6 in., 8 in., 10 in., 12 in. and 16 in. CIP.

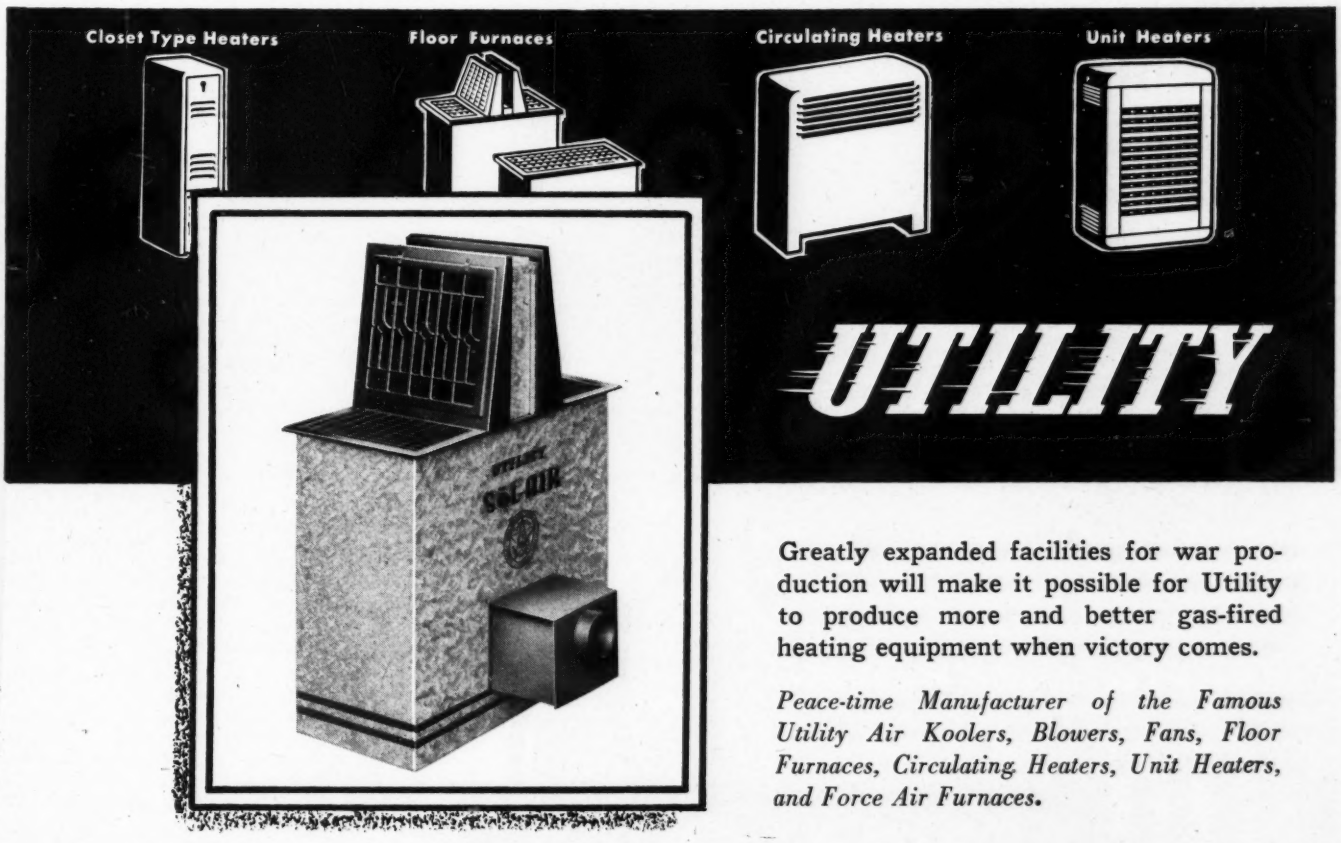
• **Worthington Pump and Machinery Corp.,** Harrison, N. J., Bulletins W-321-B7C, W-321-B13B, W-321-B14B, and W-321-B15, have to do, respectively, with open impeller centrifugal pumps, steam turbine drive centrifugal pumps, single-stage centrifugal pumps, and two-stage centrifugal pumps. They include clearly labelled cut-away illustrations, with rating tables and dimensions, together with other descriptive data.

• **Pure Carbon Co., Inc.,** Saint Marys, Pa., has recently published an eight-page booklet dealing with carbon seal rings and their application to the bellows type shaft seals. The features of carbon seal rings are detailed with relation to specific uses. Information of a similar nature is given on steam turbine seals, air seals, seal noses, etc. Drawings of seal designs are included, as well as particulars regarding the adaptability of various types of seals to other applications.

• **Surface Combustion,** Toledo 1, Ohio, has issued a four-page leaflet, "Surface Combustion Carbottom Furnaces," showing several specific installations of both convection heated and direct fired carbottom furnaces, together with data regarding these installations.

• **McLeod & Henry Co., Inc.,** Troy, New York, has recently issued a bulletin to introduce three new fire clay brick products—Hyex, Super-Hyex and Superam. These products are designed to supply the demand for fire clay bricks possessing greater spalling resistance, greater load bearing strength and greater volume of stability. The bulletin includes complete information regarding available sizes and exact applications.

• **Wheelco Instruments Co.,** Harrison & Peoria Sts., Chicago 7, Ill., announces a new edition of its Wheelco Thermocouple Data Book and Catalog, Bulletin S2-4. Containing 36 pages, the catalog gives a description of products, prices and recommendations for thermocouple users, and suggests substitutes for restricted materials. It carries the latest amendment to the WPB's Conservation Order L-134, and gives data on selection of thermocouples, lead wire, protecting tubes, heads and insulators. Also carried are temperature conversion tables, millivolt tables, and tables on pipe and wire sizes, decimal equivalents and wire resistances. Instructions are given on checking thermocouples and pyrometers, and on construction of thermocouples.



Greatly expanded facilities for war production will make it possible for Utility to produce more and better gas-fired heating equipment when victory comes.

Peace-time Manufacturer of the Famous Utility Air Koolers, Blowers, Fans, Floor Furnaces, Circulating Heaters, Unit Heaters, and Force Air Furnaces.

UTILITY FAN CORPORATION

4851 South Alameda, Los Angeles 11, California

PEOPLE

• **Ernest R. Acker,** president of the American Gas Association, has been elected to honorary membership of the Institution of Gas Engineers. Others similarly elected, for the duration of their terms of office, are **Alan H. Harris, Jr.,** president of the Canadian Gas Association, and the presidents of the Australian and New Zealand Gas associations.

• The directors of Royalite Oil Co. in Calgary, Alberta, have named **P. F. Shannon,** president, to succeed the late **John H. McLeod.** McLeod, who was 66 and who also held the post of the Imperial Oil Co. producing department for western Canada, died in Calgary on June 16.

Shannon is a graduate of engineering of the University of Kentucky. After demobilization from the AEF, he became superintendent of the Continental Oil Company's producing operations in Wyoming and Montana and held that office for six years. From 1924 to 1928 he was professor of Petroleum Engineering at the Colorado School of Mines, leaving that position to become field superintendent of the Tropical Oil Co. at Barranca Bermeja in Colombia. Later, he was made manager of all the company's producing operations in Colombia.

• **Clifford E. Paige,** president of The Brooklyn Union Gas Co., and chairman of Brooklyn's Chamber of Commerce Postwar Management Problems Committee, will head that borough's Committee for Economic Development when it is set up.

• **George Edward Dewey** has been appointed manpower counselor to the Petroleum Administration for War, it was recently announced.

Before joining PAW in 1942, Mr. Dewey had been associated with the Standard Oil Co. of Indiana where he headed the technical information division of the development and patent department for the Chicago office.

• **John B. Klumpp,** nationally known consulting engineer in the manufacture of gas, and past president of the American Gas Association, has received the degree of Doctor of Engineering from Stevens Institute of Technology. A consultant of the Council of National Defense during World War I, he has since worked on the planning and operation of many gas plants in this country, has aided the U. S. Bureau of Standards in setting up gas standards, and has represented the AGA and the former Gas Institute.

• **Leon J. Willien,** nationally known technologist on gas, has been appointed associate director of the Institute of Gas Technology at Illinois Institute of Technology, it has been revealed by **John I. Yellott,** director of the Gas Institute. In his new position with the Institute, Mr. Willien will have charge of research in gasification and related fields. Also, he will serve as consultant on water gas generation.

L. J. Willien

Willien has been associated with the Public Utility Engineering and Service Corp., Chicago, as a gas engineer since 1937. At present he is also head consultant on manufactured gas for WPB.

He has received AGA's two top awards: (1) Beal medal (1927) for the most valuable technical paper, "Developments in Water Gas Operation"; (2) Charles A. Monroe Award (1936) for his contributions to the manufacture, mixing and transmission of gas.

In 1932 Willien was made an honorary life member of the Pacific Coast Gas Association, for making "the most valuable contribution in 1932 to the gas industry on the Pacific coast"—the development of a process for the production of high Btu. manufactured gas with existing equipment. The gas can be used as a substitute for natural gas, or can be mixed in any proportions to augment the natural gas supply at times of peak loads.

He attended Rose Polytechnic Institute, receiving his bachelor's degree in chemistry in 1906, his master's in chemistry in 1908 and his chemical engineering degree in 1910.

• **Oscar Grubbs** has been named superintendent of measurement for Houston Natural Gas Corp., Houston, Tex., effective July 1. Affiliated with Houston for three years, and familiar with various phases of operation in the engineering department, he has already begun planning his new work, a primary function of which will be the complete inventory of company meters to correct and bring up to date all present meter records in the system outside of Houston.

• **Miss Elizabeth J. Lynahan** was appointed home service director of The Peoples Gas Light and Coke Co., as of July 15, it has been announced by **B. H. Wittmann,** manager of the domestic sales department. She succeeds Miss **Karen Fladoes,** who recently resigned to become home service director for a national manufacturer.

At the time of her promotion she was supervisor of the south section of the home service department. She has been with the company for nearly 10 years. In her new position, Miss Lynahan will be known to the public as Martha Holmes, the Company's name for its home service director.

On January 1, 1935 she joined the home service department of Peoples Gas, and in 1939 was appointed supervisor, a position she held to the time of her present promotion.

STANDING GUARD FOR
LONG LIFE
H-M LOW PRESSURE REGULATORS
give dependable, long-life service, economically and with a minimum of attention. Precision engineered, these regulators control the gas flow.
Send for complete details regarding available sizes and specifications.
HM REGULATOR CO.
800 EAST 108TH STREET, LOS ANGELES 2, CALIF.

R. P. Gros

Julia Hunter

• **Robert P. Gros,** acting manager of publicity and advertising for Pacific Gas & Electric Co., San Francisco, has been made manager of that department, to succeed the late **Al Joy.** He had served as field representative under Mr. Joy since 1935.

• **Will C. Grant,** advertising director, Lone Star Gas Co., Dallas, Texas, has announced appointment of Miss **Julia Hunter** as home economics director of the company succeeding Miss Albertine Berry who resigned July 11 to accept a postion as director of home economics for the Interstate Cotton Oil Refining Co. at Sherman, Texas. Miss Berry will create a new department in the Sherman company.

Miss Hunter has been assistant home economics director for Lone Star Gas Co. She is a graduate of Texas State College for Women at Denton, Texas. Her first experience with the company was as home economist in the Galveston Division office.

• **Frank H. Lerch, Jr.,** president Consolidated Natural Gas Co., New York, N. Y., has been elected chairman of the board of trustees of the Institute of Gas Technology. Mr. Lerch succeeds **Frank C. Smith,** president of the Houston Natural Gas Co., Houston, Tex.

• Appointment of **A. G. Bailey** of Montreal as deputy chairman of the Petroleum and Natural Gas Conservation Board of Alberta, with headquarters in Calgary, was announced July 15 by Dr.**E. H. Boomer,** chairman.

Mr. Bailey, who will fill the vacancy on the board left by the resignation of **Gordon Northfield,** now with the Federal Income Tax Department, will be in charge of office administration.

• **James A. Brown,** a vice president of Southern Indiana Gas & Electric Co., has been made president of the company to succeed **William H. Barthold,** who resigned as president of the company, and as chairman of the board of directors of Central Illinois Light Co. due to ill health. Mr. Brown, who has been associated with the company for 32 years, has also served other affiliates of The Commonwealth & Southern system, and at present is a director and chairman of the Finance and Control Committee of the AGA.

Mr. Barthold had held executive positions with both companies for some 30 years. He entered the utility business in 1896 when he joined Grand Rapids Gas Co., and had served the Consumers Power Co. and other companies connected with The Commonwealth & Southern Corp.

• **William J. Priestley** has been elected President of Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd., Michigan Northern Power Co., and Union Carbide Co. of Canada, Ltd., Units of Union Carbide and Carbon Corp., to succeed the late Francis P. Gormely.

• **Rosser Thomas,** credit department head of Houston Natural Gas, has been made Public Office Manager of that company. His executive jursidiction will cover the general operation of the service, credit, consumers accounting, service consultant and cashier departments. Mr. Thomas joined Houston in 1930 and has been manager of the credit department since 1931.

• **Horace Echols,** Southern Union Gas Co., Dallas, Tex., has been made town plant manager for that company at Santa Fe, New Mexico. He has been with Southern Union since 1932, working as appliance salesman, warehouseman and assistant cashier, and agent at Portales and Tucumcari, New Mexico.

Another promotion at Southern Union is that of **G. B. Oetken,** who becomes the new local manager at Tucumcari. Since joining Southern Union 12 years ago, Mr. Oetken has served as fitter's helper, fitter and time keeper, manager of piping and installation of burners at the Santa Fe Railroad shops in Clovis and Tucumcari, and serviceman at Tucumcari.

"CLEVELANDS"

Taking the Tough Jobs in Stride is a Proved CLEVELAND Characteristic

For more than twenty years "CLEVELANDS" have been put to the toughest tests on hundreds of ditching jobs in all sort of soils and over the roughest terrain, and have continuously, according to the record, delivered maximum performance. • Contributing to "CLEVELANDS" ability to deliver maximum performance under normal or emergency conditions are these features: Multi-Speed Transmission—Abundant Power — Operating Ease — Maximum Maneuverability — High Capacity Digging Wheel — Balanced Design—Unit Type Construction—Top Quality Material.

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. "Pioneer of the Small Trencher" CLEVELAND, OHIO
"CLEVELANDS" Save More . . . Because they Do More

Accurately Records

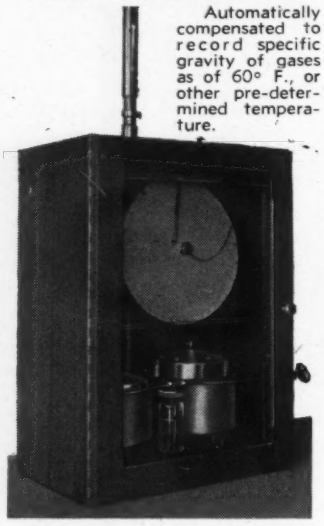
small changes in specific gravity

REGARDLESS of TEMPERATURE VARIATIONS

ARCCO-ANUBIS

GAS GRAVITOMETER

Automatically compensated to record specific gravity of gases as of 60° F., or other pre-determined temperature.



Check THESE Quality POINTS!

- Charts can be read direct to second decimal place, and to third decimal by easy approximation.
- Records even minute changes in specific gravity with extreme accuracy. Practically frictionless.
- No mechanical complexities such as electric motors, and pressure valves. Once calibrated and installed instrument requires no further attention.
- Precision-built in Arcco Laboratories. Hundreds in use by major companies.

Quick Delivery

Enlarged production facilities enable us to deliver most ARCCO-ANUBIS precision instruments on stepped-up schedule.

Send for Bulletin No. 101

American RECORDING CHART CO.
3113 E. 11th St.,
Los Angeles 23, California

• **Donald R. Shively,** until recently a consultant to gas and electric company clients on appliance merchandising, advertising and public relations, is the new manager of sales promotion for The Hartford Gas Co., Hartford, Conn. He has been affiliated with the appliance industry for many years, serving as a refrigerator distributor, manufacturer's district manager and utility association field promotion manager.

• From the head office of the Union Gas Co. of Canada, Ltd., in Chatham, Ontario, it has been announced by Lt.-Col. **T. Weir,** general manager, that **Earle W. Geddes,** district sales manager at Chatham, has been appointed district manager at Sarnia, Ontario. Mr. Geddes for the past 10 years has been district sales manager in Chatham. **Clarke Warrener** has been appointed office manager at Sarnia.

• **E. L. DeGolyer** and **Lewis W. McNaughton,** Dallas, have been elected board of director members of Republic Natural Gas Co., Dallas, Tex., it was announced by **W. H. Wildes,** president. **Frederick M. Mayer** and Mr. McNaughton were named members of the executive committee of the company.

• **Allen H. Burgess** of Ardmore, Okla., has been named district superintendent for the Oklahoma district, Oklahoma Natural Gas Co., to succeed **T. A. Wood,** who was killed July 1, by lightning while playing golf at the Oklahoma Golf and Country Club, **T. H. Sterling,** district manager, announced.

• Miss **Ruth Miriam Severson,** who has been home economist for the Iroquois Gas Co., Buffalo, N. Y., and the Kansas City (Mo.) Gas Co., has been engaged as home service supervisor according to **Christy Payne, Jr.,** sales manager of the Peoples Natural Gas Co., Pittsburgh, Pa. She succeeds Mrs. **Lemabel Parry,** who has headed the home service department of Peoples for more than a year.

• **James L. Davidson,** associated with Stone & Webster companies since 1926, has been named sales manager of the Fall River Gas Works Co., Fall River, Mass. He succeeds **H. Vinton Potter,** now on the AGA staff, heading up the Coordinated Gas Kitchen program.

Mr. Davidson has worked in Virginia, at the Blackstone Valley Gas & Electric Co., Pawtucket, R. I. and more recently in the rate department in New York.

• **Allan C. Davey,** has resigned as sales manager of Wisconsin Public Service Corp. to accept a similar post with Clark Water Heater Division of McGraw Electric Co., Chicago. Other personnel changes at Wisconsin Public Service Corp. are as follows:

Arnold G. Bur, assistant treasurer and division auditor at Green Bay since 1930, has been appointed sales manager to succeed Mr. Davey.

A new position, that of assistant sales manager, will be filled by **Dale Remington,** advertising manager.

Robert C. Horn, accounting department, succeeds Mr. Bur as division auditor at Green Bay.

A new accounting department known as the Property Accounting and Records Department has been created with **C. A. McKenna** as accountant in charge and **W. T. Jess** as assistant.

Manufacturers

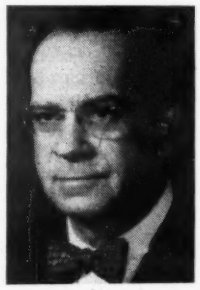
• **Ralph C. Cameron** has been appointed director of merchandising for Airtemp Division, Chrysler Corp., Dayton, O., according to an announcement by **Paul B. Zimmerman,** vice president and general sales manager. Mr. Cameron will continue to direct postwar planning activities of the company.

All advertising, sales promotion, and sales training activities of the division will be under the supervision of Mr. Cameron for the purpose of providing coordinated sales campaigns, sales training, promotional programs, and advertising for the Airtemp lines of air conditioning, commercial refrigeration and automatic residential heating.

V. P. Black will continue as advertising manager, **W. H. Knowlton,** sales promotion manager, and **Paul H. Dow** will be in charge of sales training.

• **Vally N. Braden,** a graduate of Ohio State University, B.S. Mechanical Engineering, 1917, has joined the Vulcan Proofing Co., Brooklyn, N. Y., as manager of design and production, it was recently announced.

• **John K. Knighton,** sales manager of the gas air conditioning division, Servel Inc., Evansville, Ind., has announced the appointment of **H. C. Jamerson** to the staff of the Division. For the duration he will be in charge of the coordination of the gas air conditioning sales story and creating a salesmen training program for the new product.



H. C. Jamerson

Jamerson was formerly sales manager of the Airtemp Division of Chrysler Corporation. He was also advertising and sales promotion manager for the DeSoto Division of Chrysler.

His other connection with the refrigeration industry is with Frigidaire as sales manager in charge of product distribution. Mr. Jamerson is a native of St. Louis and a graduate of Harvard University in the class of 1915.

• **Alvin R. Bravender** has been appointed Northwest distributor of the Ruud Manufacturing Co. with headquarters in Portland, Ore.

• **H. I. Beardsley,** executive in the sales department of Pittsburgh Equitable Meter Co. will shortly retire from active business. Mr. Beardsley joined the company as a water meter salesman in 1912, and for many years traveled the New York and New England territory. From 1918 to 1930 he served as district manager in Chicago and headed the gasoline and oil meter division when it was established. His successor will be **H. D. Leisenring,** an engineering graduate of Lafayette College, who formerly had charge of Pittsburgh Equitable oil products in the Chicago territory.

.complete

for every Gas control requirement

REYNOLDS Builds a Regulator for every type of Gas Control Installation. Proved by records of performance in actual operation, or by records of factory tests on new developments, every REYNOLDS unit—whether for high pressure or low—is a proved product.

Long life, efficient operation, accurate regulation, reasonable cost, low upkeep—these are the vitally important inherent features built into REYNOLDS Gas Regulators through more than 50 years of experience in developing, designing, building and testing Gas Control equipment.

Reynolds Products...

- High Pressure Service House Regulators: Straight Lever Type—Models 10-20 Series. Toggle Lever Type—Model 30 Series
- Low Pressure Service or Appliance Regulators
- District Station Regulators, Single or Double Valve, Auxiliary Bowl and Automatic Loading Device Optional
- High Pressure Line Regulators Pilot Loaded—Pilot Controlled
- Toggle Type Regulators. Single Valve, Double Valve, Triple Outlet
- Seals: Dead Weight or Mercury
- Relief Valves: High or Low Pressure
- Back Pressure Valves. Automatic Quick-Closing Anti-Vacuum Valves
- Automatic Shut-off Valves
- Lever Operated Valves
- Louver Operated Device
- Atmospheric Regulators
- Vacuum Regulators

For full cooperation of our Engineering Department, write our Factory, Branch Offices or Representatives.

☆

BRANCH OFFICES

423 Dwight Building
Kansas City, Missouri

2nd Unit
Santa Fe Building
Dallas, Texas

☆

REPRESENTATIVES

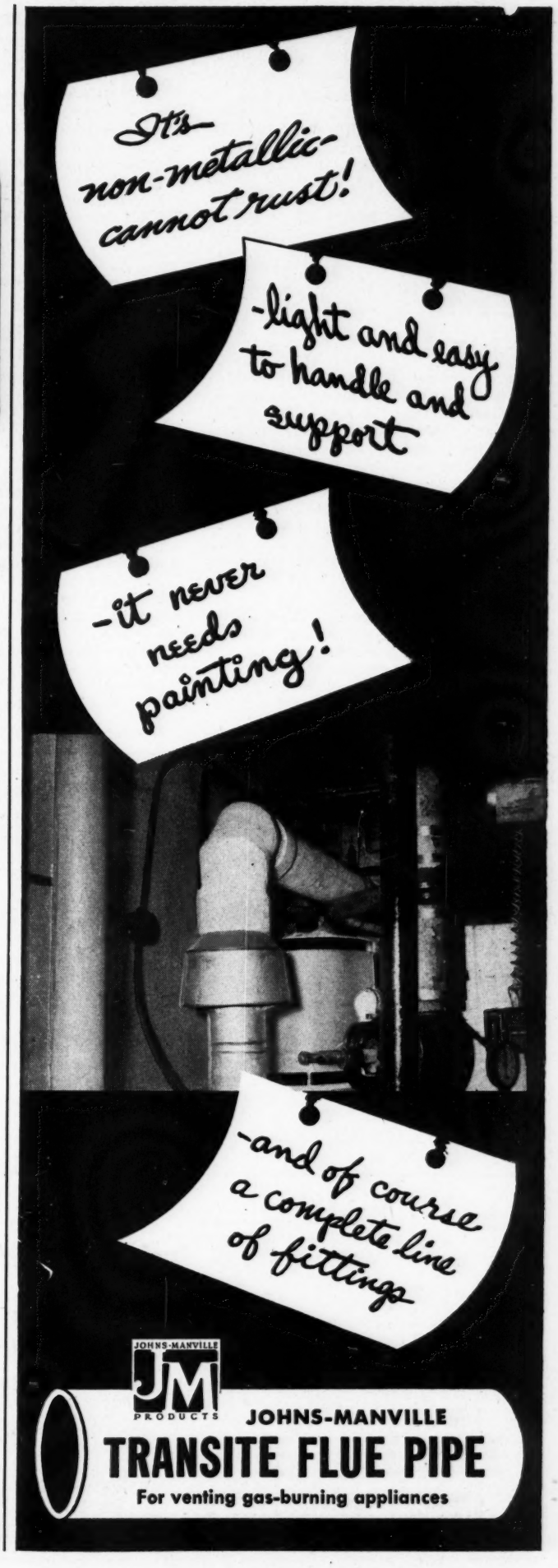
Eastern Appliance Company
Boston, Massachusetts

Wm. A. Ehlers
No. 268 Park Street
Upper Montclair, N. J.

REYNOLDS GAS REGULATOR COMPANY

☆ **ANDERSON, INDIANA, U. S. A.** ☆

GAS CONTROL SINCE 1892


It's non-metallic-cannot rust!
-light and easy to handle and support
-it never needs painting!
-and of course a complete line of fittings

JOHNS-MANVILLE JM PRODUCTS

JOHNS-MANVILLE

TRANSITE FLUE PIPE

For venting gas-burning appliances

• **D. D. Foster** has organized the D. D. Foster Co., Equipment Consultants, with offices at 412 Peoples Gas Building, Pittsburgh, Pa.

D. D. Foster

Mr. Foster, a graduate of Carnegie Institute of Technology, was previously connected with the Pittsburgh Equitable Meter Co. - Merco Nordstrom Valve Co. as district manager, and more recently as acting general sales manager.

The new company will handle the engineering sales of Norton-McMurray Co. and other manufacturers of specialized equipment for oil, gas, and chemical process industries in Pennsylvania, Ohio, and West Virginia. **A. H. Stroyd** is an associate in the firm.

• **Byron H. Atwood,** a member of the House Heating department of the Delaware Power & Light Co. since 1936, has become affiliated with the Geo. D. Roper Corp. as supervisor of merchandise sales.

Mr. Atwood has been in the utility industry in several capacities, starting in the accounting department of the Syracuse Lighting Co., and subsequently serving as sales manager of Fulton County Gas & Electric Co., sales manager of Northern Indiana Gas & Electric Co. and commercial manager of the Lansing Gas Co.

• **J. C. Kellner,** formerly assistant manager of sales service at Servel, Inc., Evansville, Ind., has been appointed acting manager of the department, succeeding **Prescott B. Wiske** who died of a heart attack June 5 in Denver, Colo.

Mr. Kellner joined the Servel organization in April, 1928. He is a native of Henderson, Ky., and a graduate of Purdue University.

Obituaries

• **Dr. Horace Chamberlain Porter,** 67, consulting chemical engineer and well-known expert on coal, died June 14. He had been sampling coal for analysis at the Pennsylvania Railroad freight yards in Philadelphia.

• **H. Edward Manville, Sr.,** 72, former chairman of the board of directors of Johns-Manville Corp. died on June 27.

Mr. Manville was the son of the late Charles B. Manville, founder of the original company, and had served for 50 years in many capacities, including the presidency and chairmanship of the board until ill health forced his retirement in 1939.

He had also served as a director of the Standard Insurance Co. of New York, the Standard Surety & Casualty Co. and the First National Bank of Pleasantville, N. Y.

• **Edgar H. Bristol,** president of The Foxboro Co., Foxboro, Mass., and one of its founders, died suddenly of a heart attack, on July 24, at his summer home at Falmouth Heights, Mass.

Mr. Bristol began employment as a machinist, later becoming a tool-maker and subsequently production manager of his father's instrument company. He withdrew in 1908 with his brother, Bennet B. Bristol, to organize the Industrial Instrument Co., which in 1914 became The Foxboro Co., and he served as president throughout its history. He was also the president of the Foxboro National Bank.

• **Bert E. Embry,** 46, former office engineer at the butadiene plant of Southern California Gas Co., succumbed to a brain infection at St. Vincent's Hospital July 3.

A graduate of the University of Kentucky, Mr. Embry had worked for the Superior Oil Co., Lexington, Ky., before becoming associated with Southern California Gas Co. in 1923 as an engineer in the transmission department. Since then he had served in various capacities until 1939, when he became office engineer in the executive vice president's office.

• **Tillman A. Wood,** Oklahoma City, Okla., district superintendent, Oklahoma Natural Gas Co., was killed, July 1, by a bolt of lightning while he was playing golf on the Oklahoma City Golf and Country Club grounds.

Mr. Wood was 47 years old, a native Oklahoman and widely known champion amateur golfer. He had been connected with the Oklahoma Natural Gas Co., since 1921. He is survived by a wife, two daughters and a son.

• **Martin B. Buckley,** 58, industrial new business manager for The Gas Service Co., Kansas City, Mo., died June 30 in Topeka. Mr. Buckley had served the company for seven years, having previously been associated as commercial manager with the St. Joseph Railway, Light, Heat & Power Co.

• **Aylmer W. Keith,** 59, chief system dispatcher for the San Diego Gas & Electric Co., died in his home July 16. A native of Healdsburg, Calif., he came to San Diego County 57 years ago. Before joining the San Diego utility in 1915, he worked on engineering projects in various California and Arizona areas.

• **Ivan M. Roberts,** 60, assistant chief chemist of Laclede Gas Light Co., St. Louis Mo., died June 22 of a cerebral hemmorhage. He had been associated with the company for more than 40 years. Roberts joined Laclede as a laboratory assistant at Station B, subsequently advancing to manager of the laboratory, when the new coke plant was put in operation (1915).

• **William H. C. Grant,** 54, supervisor of structures division of Cincinnati Gas & Electric Co., died of a heart attack June 10. He had been a member of the department since 1937, having previously served for 10 years as an engineer with the Public Utilities Commission of Ohio.

GAS METER INDEXES AND FITTINGS

Many Standard Meter Parts Carried in Stock

We will be pleased to submit quotations to your specifications and blueprints.

THE E. F. GRIFFITHS CO.

346 E. Walnut Lane **Philadelphia 44, Penna.**

IT'S LIKE *writing* A LETTER HOME

These ads month after month . . . telling you that all of our production is going to war . . . are simply to remind you that the name to remember when you want real snap-acting gas controls after the war is

SPENCER THERMOSTAT CO. KLIXON ATTLEBORO, MASS.

PIPELINE NEWS

• A contract for construction of the 100-mile final section of the **Southern California-Southern Counties Companies'** La Goleta-Los Angeles pipeline, linking the Haskell Ave. station with the Hollywood Holder station, was awarded to Macco-Robertson Co., it was announced by B. M. Laulhere, manager of engineering services. This portion of the line is about 10½ miles long, with 22-in. piping needed, and is expected to be started by the middle of September and completed by December 1.

In the meantime, the Pacific Pipeline Construction Co., which received the contract to build the Ventura-Haskell Avenue section of the line, is proceeding with the clearing and grading of the rights of way along this 55-mile link. Above Ventura, the same company will build the Southern Counties' section of the project between Ventura and the Goleta dry gas field, source of supply.

First deliveries of the 18-in. pipe that will be installed between Ventura and the Haskell Avenue Station were made last week, the pipe being shipped directly from the rolling mills to sidings near the job. From there, it will be hauled out and strung along the trench, where the lengths will be welded together and pipe wrapping and coating applied before it is lowered into the trench.

• Applications to build gas pipelines in Oklahoma and Kansas, filed by the **Consolidated Gas Utilities Corp.**, of Oklahoma City, Okla., were heard before Marvin Farrington, examiner of the Federal Power Commission, at Oklahoma City, June 26. The applications drew no opposition. The examiner will report to the F.P.C. in Washington.

The Oklahoma line is in Caddo county, Oklahoma and already has been built under approval of the WPB and temporary authorization of the FPC. It is 3½ miles of 8⅝-in. pipe in the West Cement field to carry gas from wells producing for the Consolidated Gas Utilities Corp., to a connection with the 20-in. transmission line to Oklahoma City, of the Cities Service Gas Co., connecting near the Ray Stephens dehydration plant. A number of gathering lines also were constructed in the field.

The Kansas line includes one mile of 4½-in. pipe to connect the Wellman field with the Sterling, Kansas, distribution system owned by the Consolidated Gas Utilities Corp. This line will replace a section of 5½-in. line which is worn out and showing excessive leakage. The new line, not yet built, will connect with a 6-in. lateral of the Consolidated, which leads to the Wellman field.

Gas and Penicillin

The magic drug penicillin is packaged in rooms where the required relative humidity must be 15% and the temperature must be 74° F. The highly developed gas-operated dehumidifiers with after coolers, keep these exacting requirements day and night.

We have prepared a 15 page study of

Panhandle Eastern Pipe Line Co.

Common Stock

Under the "Mokan Plan" recently approved by stockholders, 163,710 shares of the above stock are being offered under rights to stockholders of

Missouri Kansas Pipe Line Company

Subsequently, upon liquidation of Mokan's secured debt, an additional 363,802 shares of Panhandle stock are to be offered in exchange to Mokan stockholders.

A copy of our analysis will be mailed upon request.

KIDDER, PEABODY & CO.
FOUNDED 1865
Members New York Stock and New York Curb Exchanges
NEW YORK — 17 Wall Street
BOSTON — 115 Devonshire St.
PHILADELPHIA — CHICAGO

A dependable control for your water heater insures its efficient functioning . . . it is the final touch that guarantees satisfaction to the user of your product.

DOMESTIC THERMOSTATS have won wide acceptance in the gas industry because they provide long-lasting, dependable service—*hot water at the desired temperature whenever it is wanted.*

You can count on DOMESTIC both as to quality and as a dependable source of supply.

Domestic
DOMESTIC THERMOSTAT COMPANY
Los Angeles, California

Monarch Engineering Sold To Fisher Furnace Co.

The industrial furnace business of the Monarch Engineering and Manufacturing Co. of Baltimore, Md., has been purchased by the Fisher Co. of Chicago. The transaction gives Fisher all rights to manufacture Monarch equipment and includes all patterns, drawings and parts inventories.

Future plans provide for the continued manufacture of certain specialized Monarch Furnaces with improved design features, and the continuation of a complete parts service for Monarch furnaces now in operation. All Monarch furnaces to be carried over into the Fisher line will be subjected to a thorough revamp and modernization program by the Fisher engineering department at Chicago. Combined headquarters and manufacturing facilities will be located in the two existing Fisher plants in Chicago for the present.

Regulation of Texas Gas Production Planned

Gov. Coke Stevenson expressed confidence that a plan for regulation of natural gas production in Texas will be presented to the Legislature when it meets next January. It is probable that some attempt will be made to change the production tax on gas which now is 5.2% of market value. Two proposals made informally have been for a tax based upon volume of gas rather than upon its market value and for a tax graduated according to the distance the gas is piped from the well to the consumer. A new step into the regulatory field which the Railroad Commission may soon undertake is for mandatory pressure maintenance in recycling gas to remove its valuable liquid elements.

Arkansas-Louisiana Puts New Gasoline Plant to Work

Arkansas Louisiana Gas Co., a subsidiary of Cities Service, has put into operation its thirteenth gasoline plant and fifth in the East Texas area. The plant is in Panola County, 10 miles northeast of Carthage, and has a capacity to process 25,000,000 cu. ft. of gas daily. It was built almost entirely out of salvaged materials, reclaimed and reconditioned to give as good service as new material. The plant is of the usual absportion type. Gas from the pipelines of the company, which were extended 10 miles to bring in the field production, enters the plant through two vertical separators and is measured through two 10-in. meter runs.

Guymon, Okla., Plant Sold

Property owners of Guymon, Okla., voted 155 to 42 to purchase the natural gas distribution system of the Southwest Public Service Co. A $14,000 bond issue will be utilized for purchase of the property and connecting the acquired system with the lines of an existing municipal gas plant in Guymon. This will eliminate all competition with the municipal plant.

Detroit-Michigan Stove Co. Producing Standard Models

Resumption of production of a standard domestic model of each of Garland and Detroit Jewel gas ranges has been announced by the Detroit-Michigan Stove Co., following recent revision of order L-23-C.

The renewed activity marks the first manufacture of domestic gas ranges by the company since July, 1942, when materials were diverted to war uses and plant facilities were turned to production of armor plate for planes and military vehicles, parts for jeeps and heavy duty ranges for military and essential civilian uses.

The new models are full size, full porcelain, the announcement states, with many pre-war features, including four top burners with separate simmering flames, automatic top lighter, ball bearing drawer type broiler and heavily insulated oven with inner seal door construction. An extra large utility compartment and a large utility drawer are also provided.

Dresser Industries Acquire International-Stacey Corp.

Dresser Industries will acquire financial control of International-Stacey Corp. of Columbus, Ohio and subsidiaries in a step designed "to enlarge postwar participation in oil field equipment potentials," H. N. Mallon, president of Dresser disclosed recently. Dresser's net worth is approximately $10,000,000 and that of International-Stacey, $5,000,000.

Dresser and International - Stacey stockholders will be asked to ratify the agreement in special meetings to be called soon. No change in management or personnel of International-Stacey companies are involved or contemplated, Mr. Mallon said.

WPB Conservation Division Releases "Winterizing" Code

The Conservation Division of the War Production Board has released its "1944 Manual for Winterizing the Home." The manual deals with every phase of home planning and protection and it is hoped, according to Davis M. DeBard, Deputy Director of the Conservation Division, WPB, that this recent information will help at least a million homes this coming winter.

SKINNER

Leak Clamps Saddles

M. B. SKINNER CO.
SOUTH BEND, IND.

CLAMPS AND SADDLES FOR CAST IRON AND STEEL PIPE. STANDARD OF THE WORLD FOR NEARLY HALF A CENTURY

SEMET-SOLVAY ENGINEERING CORPORATION

Blue Gas Plants
Water Gas Machines
Washer Coolers
Naphthalene Scrubbers
Gas Purifiers
Condensers
Waste Heat Boilers
Producer Gas Plants

40 RECTOR STREET, NEW YORK, N. Y.